The Chemical Age

A Weekly Journal Devoted to Industrial & Engineering Chemistry

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Contents

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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A New Policy

THE deliberate exclusion from the Dyestuffs Act Advisory Committee of a trader representative raises a question of considerable importance. It seems to imply that both Parliament and the Board of Trade have committed themselves to the principle of direct trade between producer and consumer, and are prepared to enforce that principle in the dyestuffs industry as a starting-point. This is essentially a reversal of the commercial history and traditions of this country. It is true that we are a great nation of producers, but equally we are known the world over as the principal trading, distributing, and carrying nation. This distributive trade has resulted in an immense and complicated system of exchange, by which our merchants bring into effective contact the producers of the world with the consumers of the world. It is a system as much to the advantage of the manufacturer as to the advantage of the consumer, for it ensures to the one party the fullest possible outlet for the absorption of his products and to the other the fullest possible choice of goods at prices regulated by fair competition. In connection with the dyestuffs industry the Board of Trade refuses to recognise the distributive factor. At least, it has deprived it of any voice in the licensing of dyestuffs. As a principle this means the extinction of the merchant as an intermediary between producer and consumer, and, carried to its logical conclusion, all forms of shop-keeping would come to an end. Lord Askwith, this week in London, commented with some frankness on this dangerous policy of trying to eliminate the merchant. His speech may do something to raise this important issue in all trading communities.

If this policy were imposed on all Government departments concerned in trade, whatever might be thought of its commercial wisdom we should at least have some appearance of consistency. But while the Board of Trade have either proposed or accepted the principle of excluding traders from the home dyestuffs industry, the Department of Overseas Trade announces with some pride that it makes "no preferential treatment between the manufacturer and the merchant," and apparently desires the hearty co-operation of both in the development of export trade. Mr. F. G. Kellaway, M.P., the Parliamentary Secretary to the Department, recognises the gravity of the position in reminding us that "the fiercest struggle for foreign trade since our merchant adventurers first set sail will soon engage the whole fabric of British industry. For us and for most other nations the only way of replenishing the national coffers and replacing that vast wealth which has been expended and destroyed is to increase our overseas trade. The more quickly we develop our export trade, and so strengthen our exchanges, the sooner we shall lighten the burden of taxation." In such circumstances one would have thought that the activities of our merchants in searching out customers all over the globe and setting the old system of barter and exchange in full motion would have been welcomed. But the pleasant view is taken in some quarters that for the future we can do without them.

To take a hypothetical case relating to dyestuffs. Assuming that an order for half a dozen classes of goods, including dyestuffs, comes in, say, from the Far East or from South America to a British merchant. In five cases the goods are at once available for export, but in the sixth the dyestuff manufacturers refuse supplies on the ground that they distribute their own goods direct. What happens? The merchant has to arrange for the dyestuffs to be supplied, say, from Germany or the United States. Even if allowed to be imported into this country exclusively for re-exportation, it means the consumption of German or American goods instead of British, and the consequent increase of business for German and American rivals. If it is not allowed into the country at all, the position becomes still worse. For then the stuff might be shipped direct from Hamburg or New

York as a separate consignment, and the foreign customer would see at once that the British merchant had been unable to obtain his supplies in his own country. Could one imagine a better advertisement for our foreign competitors, or a greater disservice to British export trade? This subject is one which deserves serious consideration from the national point of view. In the long run neither manufacturer, nor merchant, nor any other class can benefit from any system which tends to restrict foreign trade when the country's chief need is its vigorous expansion. And what is wanted at home is co-operation and good understanding between all interested in British trade.

Potash from Blast Furnace Gas

THERE would seem to be considerable promise, once the evolution born of experience has had time to assert itself, for the electrostatic process whereby potash is recovered from blast furnace gas. The cleansing of gas from suspended physical impurities, both solid and liquid, by electric discharge has constantly attracted attention during the past ten years, and from the commercial standpoint it has two direct advantages, namely, the principal product, by reason of its better condition, may be employed far more efficiently, while the recovered product should in many cases more than meet the costs of operation. Another application of electrical discharge, the removal of suspended liquid vesicles, presents considerable difficulties as contrasted with solid particles, for the insulation is always tending to be upset. However, in America Professor White has met with a good deal of success even when operating with large installations.

In this country interest is mainly centred on the Lodge electrostatic process, which has been applied on a large scale at Skinningrove by Messrs. Hutchinson & Bury. Blast furnace gas contains about 4 to 6 grammes of solid particles per cubic metre, and this material when collected is found to have a content of about 27 per cent. of potassium chloride. At Skinningrove the cleaning plant started up last year has to deal with the whole of the blast furnace gas derived from more than 3,000 tons of pig iron per week, and the dust content of this gas is reduced, after passing through the electrostatic plant, to some 0·3 gramme per cubic metre. For the recovery of the potassium chloride the dry dust is lixiviated with water so as to produce a slurry, the latter being boiled and afterwards filter-pressed into dry cakes. By means of a series of washing and filtering processes the cake is eventually freed from soluble salts. The wash liquors are collected, and, when sufficiently saturated, they are heated by indirect steam and are fed continuously into a Kestner evaporator. In the evaporator the calcium chloride in the liquor is separated from the potassium and sodium chloride. The mixed crystals of the two last named are then dissolved in hot distilled water, subjected to final evaporation, and the potassium compound is separated out by fractional crystallisation. The majority of our readers are, of course, aware of the success with electrical discharge precipitation which has been achieved in America by Cottrell and others; and even the character of the black smoke issuing from factory chimneys has been sensibly changed. There can be no question that as a dust arrester the electrical method possesses many advantages over the more common forms of water seals or fabric filters, not only from the point of view of efficiency of extraction, but also from considerations of operating costs. Mr. Bury and his collaborator gave some interesting details of the Skinningrove installation some few months ago, and it is to be hoped that when the large scale plant has been in operation for a year they will publish further particulars of any modifications which may have been found necessary.

Two Hopeful Signs

IN spite of the recent slackness in the chemical industry, the tone of late has been comparatively cheerful. This may be mere optimism—though that quality even when unsupported by evidence, is an asset in itself—or it may be based on solid considerations. We are inclined to think that it is justified, though it may be a little exaggerated. The recent stagnation is not confined to the chemical industry alone. It is almost universal. During a period of unusual abundance of spare cash, which was spent with perhaps improvident freedom, trade developed an almost neurotic activity at prices, in many cases, without precedent. No one could have reasonably expected this to last for ever. The end of the spending capacity has come upon the country suddenly, and just as suddenly has produced depression where there was before undue inflation. Concurrently with this the pressure of heavy imperial taxation and alarmingly increased local rates has made itself unpleasantly felt, and for the moment business finds itself out of breath, and in need of a rest. There has fortunately been nothing resembling panic. The position has been accepted as natural, and almost everyone is looking forward in a quietly confident spirit to a gradual recovery. That attitude of mind is in itself of immense commercial value. Before another six months are over, we trust that the present confidence will have been more than justified by results, and if in that period a few more of the purely speculative elements which have been so prominent in the last few years disappear for good, the position will be the better for the sound concerns that remain.

Another matter for satisfaction—perhaps for some degree of surprise—is the very small percentage of unemployment among chemists. There are, of course, exceptions. One hears of cases where years of distinguished war service have been rewarded by retirement. Generally, however, it may be said that chemists of moderately good attainments and capacity need not remain long disengaged, and concerns abroad desiring the services of good men, and willing to pay respectable salaries, are rather surprised at the small number of applicants. The advance in the standard of salary and conditions is due to the collective influence of various bodies all working in the same direction. The number of openings is probably explained by the increasing recognition by heads of great industrial concerns of the importance and commercial value of the chemist and chemical engineer.

Short Time

DESPITE the continued growth of unemployment during the last few days, the attitude adopted in certain labour circles with regard to short time in the industries affected, continues to be antagonistic. Judging from the conferences held this week, it would appear that the Trade Unions generally are willing to accept short time only if it does not involve any reduction in wages. In the chemical trades, however, the question is being dealt with in a more sympathetic manner, and in several cases where employers have been faced with the prospect of discharging hands or of adopting a short time system, the latter alternative has been employed with success. J. Bibby & Sons, Ltd., seed crushers, of Liverpool, have installed a system which at present concerns the warehouse and mill workers, who number about 1,700, and it is of interest to note that although the scheme was first conceived by a director of the company, it has actually been brought into being by the workmen themselves. The idea is that the men should provide part employment to 50 or 60 unemployed men by giving up three days in fifteen weeks of their own employment. The company will deduct 6d. in the £1 from the wages of each man concerned and this will be paid back to him when he takes his three day's voluntary holiday. The extra men taken on will receive a flat rate of £3 15s. per week. As at present arranged the scheme will be in operation for a period of fifteen weeks, by the expiration of which time it is hoped better conditions will obtain. The dilution scheme suggested by the United Alkali Co. at Widnes has been unanimously rejected by the workmen on the ground that there was not even enough work for those kept on and that the position was already insecure. This decision makes the position more complex and it is hoped that better counsels will prevail amongst the men, for there is no doubt that the only way of alleviating the present distress lies in the distribution of the existing volume of work among the largest number of men.

Various Forms of Benzol

ABOUT twelve months ago we drew attention to the fact that there appeared to be little attempt at consistency in the spelling of the word benzol. At that time we stated that we preferred the word in its old form without the final "e"; and that had not the motoring people and their journals introduced, probably from ignorance, the new form, the question would never have arisen. In view of the fact that the "ol" termination is of German origin, one does not unnecessarily wish to encourage its use, but, if we are to start expunging words for this reason, the whole of our chemical nomenclature will require very drastic revision. "Benzole" itself is not, perhaps, altogether objectionable, but—to preserve consistency—one must necessarily proceed to the succeeding members of the series, and it is difficult to tolerate such forms as "toluole" and "xylole."

The situation has been complicated by the fact that Mr. S. E. Whitehead has just written an excellent work of reference which he calls "Benzol," and, as he is an acknowledged authority on the subject, his rendering of the word is not to be disregarded. On the other hand, our contemporary, *The Gas World*, published a couple of weeks ago a review, written by Professor Cobb, of Mr. Whitehead's book, and in four consecutive lines we note that the Professor spells benzol twice without the final "e" and once with it. However, in referring to the context it will be found that Professor Cobb probably has method in his variations, for he appears to refer throughout to the crude material as benzol, while he speaks of the rectified motor spirit as benzole. The two products certainly possess very different characteristics, and it will be generally agreed that such a method of distinguishing them is helpful. The trouble will be to get the two words standardised so as to avoid confusion, in which case we shall, have four forms namely, benzol, benzole, benzene, and benzine, all of which will refer to distinct compounds.

Rubber Chemistry and Technology

WE have arranged for the exclusive publication of a series of important articles on "Recent Progress in Rubber Chemistry and Technology," specially written for THE CHEMICAL AGE by Dr. Philip Schidrowitz. These contributions, together with others by well-known authorities on different branches of chemical industry, will appear early in the New Year.

The Calendar

Jan.		
17	Chemical Industry Club Monthly Meeting. Address by Mr. H. E. Coley, on his recent tour in in Borneo. 8 p.m.	2, Whitehall Court, London.
18	Society of Chemical Industry (Edinburgh Section)	Edinburgh.
18	Hull Chemical and Engineering Society: "Evaporators and Evaporation," by J. A. Reavell. 7.30 p.m.	The Metropole, West Street, Hull.
18	Mineralogical Society: Papers by A. F. Hallimond; W. A. Richardson; L. J. Spencer; G. F. Herbert Smith; G. T. Prior. 5.30 p.m.	South Kensington, London.
19	Society of Chemical Industry (Newcastle Section): "Colloids," by Emil Hatschek. 7.30 p.m.	Armstrong College, Newcastle-on-Tyne.
20	Society of Dyers and Colourists (West Riding Section): The Dyeing of Artificial Silk," by L. P. Wilson	Yorkshire.
20	Royal Society: Papers by Sir Robert Hadfield; S. R. Williams and I. S. Bowen; W. S. Tucker and E. T. Paris; E. A. Milne and R. H. Fowler; L. V. King	Burlington House, Piccadilly, London.
20	Royal Institution of Great Britain: Bio Chemistry (Vitamins). Lecture I. By Arthur Harden	Albemarle Street, Piccadilly, London.
20	Chemical Society. 8 p.m. ...	Burlington House, Piccadilly, London.
21	Royal Institution of Great Britain: "Cloudland Studies," by Sir James Dewar. 9 p.m.	21, Albemarle Street, London.
21	Chemical Society: "Discharge of Electricity through Gases," by Miss M. Carlton	Royal College of Science, South Kensington.
24	Chemical Association: "The Founders of Chemistry," by W. E. Abbott. 4.30 p.m.	Royal College of Science, Dublin.

Coal Handling in the Power House

The Equipment of the British Cellulose and Chemical Manufacturing Company

AN article in a recent number of *The Electrician* from the pen of Mr. G. F. Zimmer, A.M.I.C.E., deals with coal handling and storage installations for power houses, in which one conveyor of the gravity bucket type answers all or a number of handling purposes. The variety of purposes for which in such cases one conveyor is used, includes accumulation of the coal on to a stock pile; its withdrawal from this to the active store bunker of the boiler house, and incidentally, if required, the disposing of the ashes and clinkers from the boilers. Generally, the lay-out of such installations is in one vertical plane, that is, the reserve storage pile and the boiler house are placed tandem-fashion, on the same centre line.

Some Unique Requirements

A distinctive new feature has arisen from the unique requirements of The British Cellulose and Chemical Mfg. Co. for their new boiler house. When completed, this will consist of three distinct boiler houses with one common reserve coal store in the form of a large bing, extending the whole width of the boiler houses (a distance of 220 ft.) and parallel with them. This bing is 50 ft. wide and provides storage for 2,000 tons of coal.

In the plant under consideration the topographical conditions are favourable in so far that the coal arrives by rail at a sufficient elevation for it to be brought right over the coal storage space on an overhead rail track and gantry. It is thus discharged to stock by gravity, no conveyors being needed for its accumulation, under these favourable conditions. A coal pile, lodged upon a concrete platform raised about 4 ft. above the ground level, has a two-fold advantage. Firstly, the coal is deposited in a high and dry position; secondly, the excavation for the tunnel by which the coal is withdrawn to the three boiler houses has not to be so deep; incidentally, the excavated ground could be disposed of by being utilised for the formation of the platform.

Tipping Tray Conveyors

Beneath the central portion of the coal bing and in the same vertical plane is a culvert, in which is installed one of Messrs. Babcock & Wilcox's tipping tray conveyors, having a capacity of 40 tons per hour. The arrangements allow for a second conveyor of this type being installed at a later date as the plant is extended. One of these conveyors travels to the right and the other to the left. The coal is withdrawn from this coal heap by gravity, through duplex valves pitched about 8 ft. apart, through openings communicating between the pile and the culvert. With this arrangement it is possible to reclaim coal for use in any, or in all, of the three boiler houses, from any point on the coal heap; and about two-thirds of the coal can be withdrawn by gravity from this reserve stock without resorting to any trimming. The remainder, which lies too remote from the openings and duplex valves, has to be trimmed, but it is the general practice to let this coal lie undisturbed, as an "iron ration," only to be used in cases of emergency.

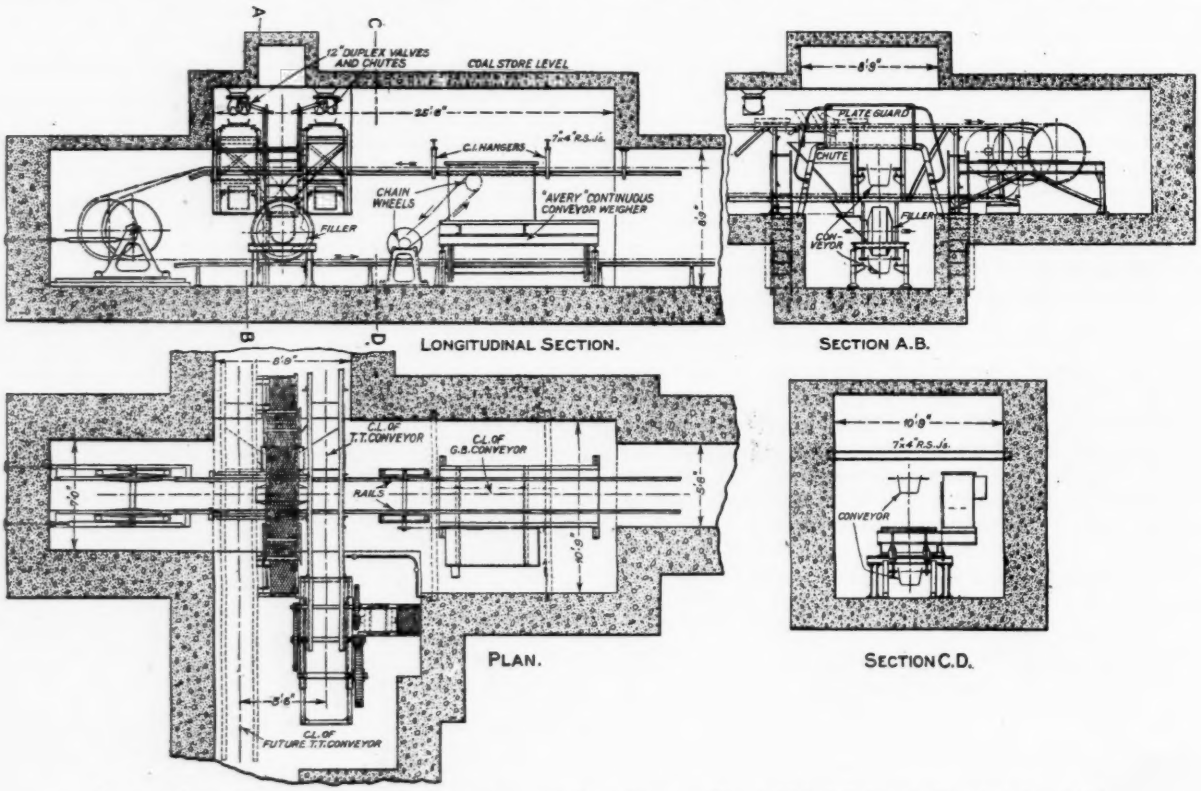


FIG. 1.—PART ARRANGEMENT OF CONVEYORS UNDER COAL STORE. (The British Cellulose & Chemical Co., Ltd.)

Gravity Bucket Conveyor Essential

Since the coal bing now lies parallel to the three boiler houses and at right angles to the three firing aisles, a distance of 114 ft. between the boiler-house wall and the centre of the coal bing, it is necessary for the coal for each boiler house to be conveyed by a separate conveyor which takes its feed from either one or other of the two tip-tray conveyors under the reserve coal-store. Since this same conveyor has also to elevate the coal and distribute it, in each case along a horizontal run over a series of bunkers extending over the

whole length of the boiler house, the gravity bucket conveyor was the only suitable device (the capacity being also 40 tons per hour), and the most satisfactory solution, as it is more immune from breakdowns than most other types of conveyors, has a longer life and requires next to no attention; the upkeep also is trifling.

Fig. 2 is a general ground plan of the installation, the boiler houses being on the right-hand side and for the ultimate capacity of the station. The lay-out is arranged for three boiler houses, No. 1 having been completed and containing six Babcock & Wilcox boilers. The other two boiler houses will contain the same number of boilers. At the right-hand side of the plan is also shown a series of overhead bunkers, with 12 hoppered outlets, one over each of the 12 stoker hoppers. At the left-hand side of the plan is the coal bing, shown dotted, and the two tip-tray conveyors side by side in the culvert, which latter is shown in sections. Here are also the three culverts which bring the coal from any part of the bing to any one of the three boiler houses. Fig. 5 is a cross-section on *AA*, through No. 1 boiler house, with the active coal bunkers over; their capacity amounts to approximately 600 tons. The 12 outlets of these bunkers, already mentioned, are provided with simplex valves operated by chains from the firing floor. These valves are accessible by two gantries running along the buckstays of the boiler setting at each side of the firing aisle. In this cross-section (Fig. 5) may also be seen the upper run of the gravity bucket conveyor in the monitor of the roof, with the gangway at each side from which six standard dumpers can be thrown in or out for the distribution of the coal over the bunkers. A section through the culvert in which the gravity bucket conveyor runs to the boiler house is also shown.

Path of the Gravity Bucket Conveyor

The cross-section *B*— *B* illustrates the two tip-tray conveyors in their culvert, and the openings through which the coal

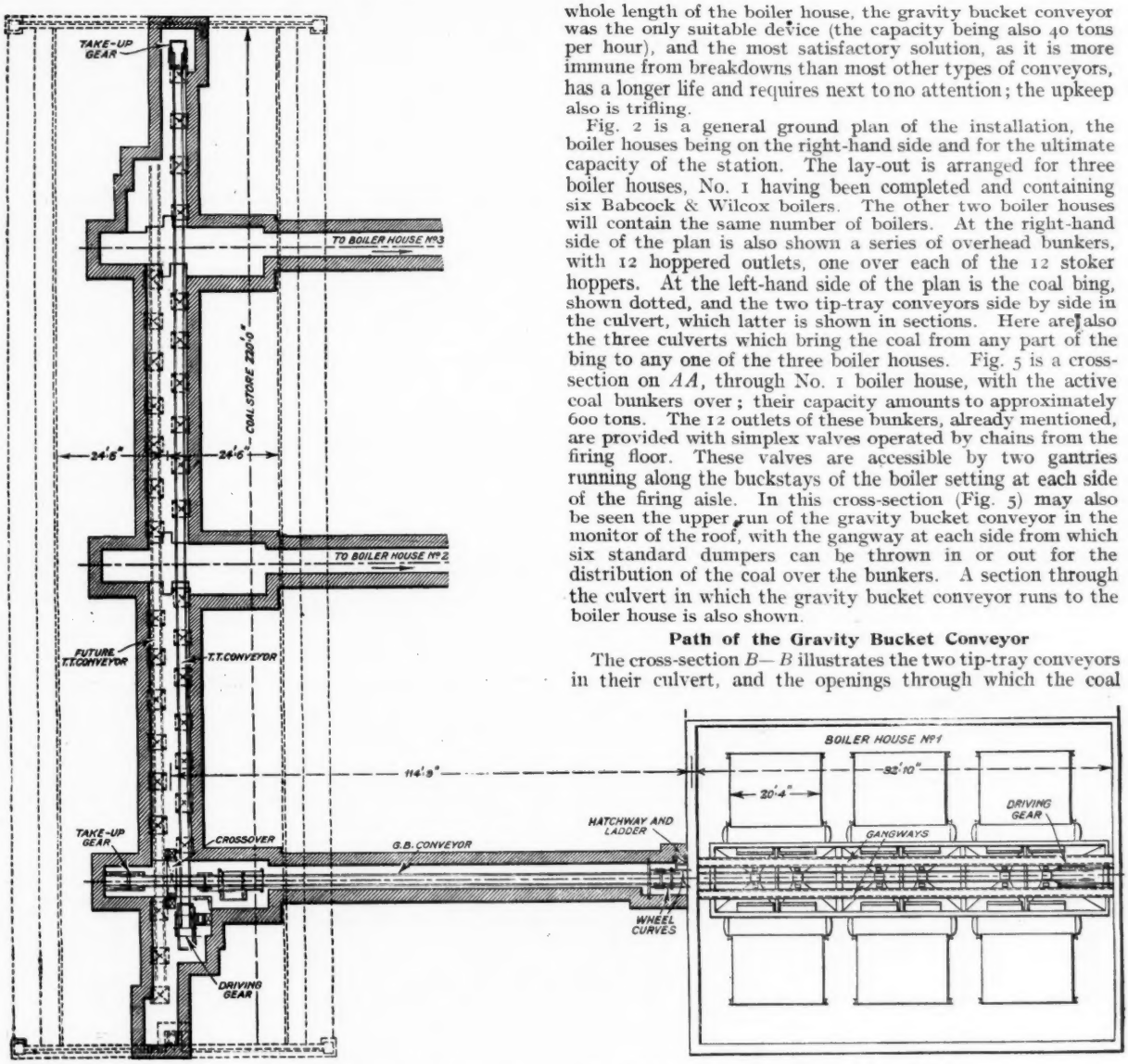


FIG. 2.—PLAN OF COAL HANDLING PLANT. (The British Cellulose & Chemical Co., Ltd.)

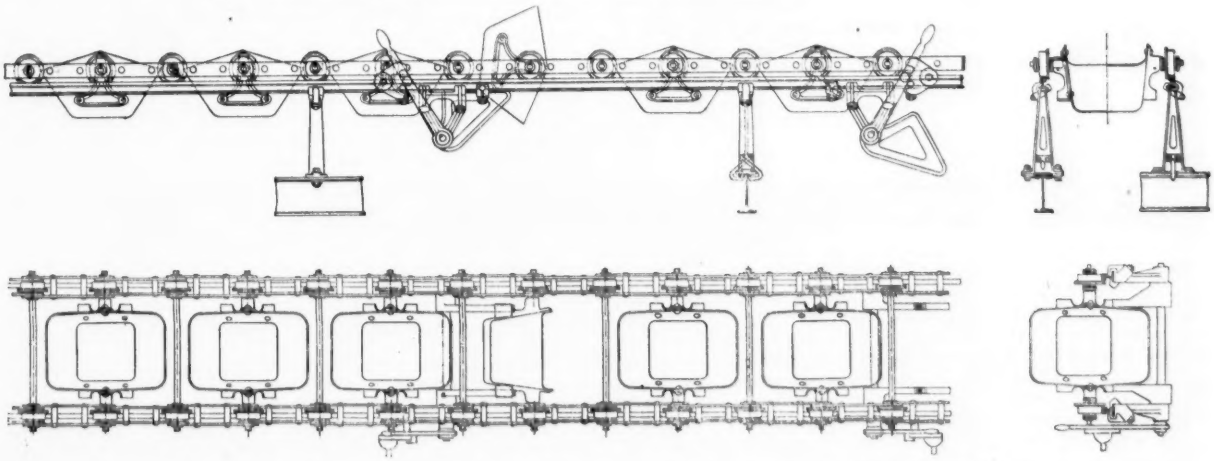
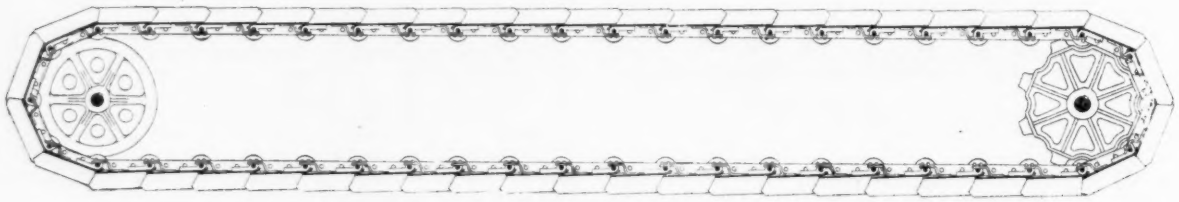


FIG. 3.—SILENT GRAVITY BUCKET CONVEYOR, SHOWING BUCKETS, CHAIN, DUMPERS, &C.

enters the duplex valves. The lower longitudinal elevation is a section through the main culvert which houses the two tip-tray conveyors and shows one row of 17 duplex valves, by which the coal is withdrawn. The upper view is a longitudinal section through one of the boiler houses, showing the complete path of one of the gravity bucket conveyors from the receiving terminal under the reserve coal store to the



IMPROVED TRAY CONVEYOR FOR OVER END DELIVERY ONLY.

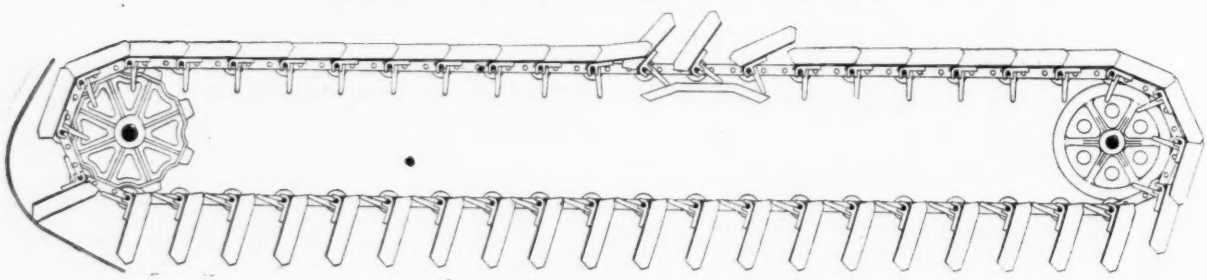


FIG. 4.—TIPPING TRAY CONVEYOR.

front wall of the boiler house where it ascends to the level of the monitor in the roof, traverses horizontally over the active coal store in the boiler house to the other terminal, where, also, the electric motor for driving the conveyor is situated. It will be seen from this longitudinal section that the upper run of each gravity-bucket conveyor passes between the upper and the lower runs of the two tip-tray conveyors, so that it can take its feed from either through the standard revolving fillers.

In order to emphasise the more important and somewhat complex portion of this installation, which can scarcely be followed from the small scale drawing, the illustration (Fig. 1) is given, which will elucidate this particular portion. The plan view shows the driving terminal of one of the tip-tray conveyors, together with its driving motor, countershaft and gearing. The second tip-tray conveyor—which is only indicated in dotted lines—as has been already mentioned, is not yet installed. At the extreme left of the plan view the tension end of the gravity-bucket conveyor which feeds boiler house No. 1 is shown. Immediately after leaving the tip-tray conveyor with its load, the gravity-bucket conveyor passes over an Avery continuous-weigher conveyor, which automatically records the amount of coal passed over it.

In the longitudinal elevation above the plan may be seen, in cross section, the two tip-tray conveyors with the duplex valves over, by which they are fed from any part of the coal bing. The coal slides down from these conveyors into a stationary filler which delivers the coal on to the lower run of the gravity-bucket conveyor. The upper and lower runs are 5 ft. 8½ in. apart, in order that the upper run can have a clear path through between the upper and lower runs of the

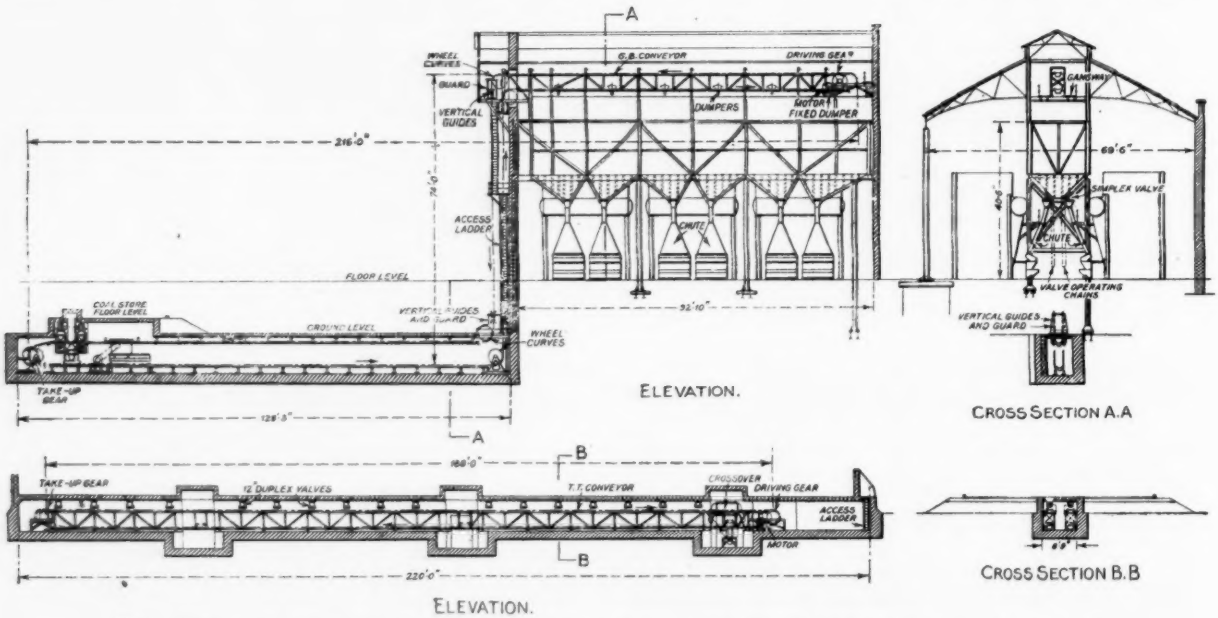


FIG. 5.—GENERAL ARRANGEMENT OF COAL HANDLING PLANT. (The British Cellulose & Chemical Co., Ltd.)

tip-tray conveyors. Sections *A—B* of this drawing clearly show the points at which the tip-tray conveyors discharge into the shoot which communicates with the filler. The steps and gangway over the gravity conveyor may also be seen. In section *C—D* a view of the gravity-bucket conveyor is represented, and the method by which the small driving power for the weighing machine is taken from this conveyor is also shown.

Construction of the Conveyors

The gravity bucket conveyors (see Fig. 3, which gives four views of these) consist, as is well known, of an endless train of tipping buckets linked together, and so arranged that whether the conveyor is being led horizontally, vertically, or at any intermediate angle, the buckets always remain normal to the horizontal plane until they encounter the tripping gear, when they are forcibly tipped and emptied. Immediately after this process they assume their normal position once again, being supported on pivots well above their centre of gravity. The endless moving chain of these conveyors is always in balance, and when empty will stop at any position; the driving power required is therefore merely what is necessary in order to overcome frictional resistance, plus that in actual foot-pounds necessary to lift the weight of the coal from the receiving hopper to just above the bunkers. The chain links are bushed and the supporting rollers are carried on the bushes, and not only are the parts interchangeable, but the axles and bucket studs also. In practice it has been found that where lubrication is thoroughly attended to during the earlier stages of the installation, fine smooth surfaces are obtained in all the various parts of the chain. Each individual bucket is stamped out of one sheet of mild steel. The driver and wheel curve bearings are made self-aligning, with large bearing surfaces, thus avoiding binding and extra friction in the driving gear and shafting.

Tip-Tray Conveyors

With the tip-tray conveyors (Fig. 4), the discharge is independent of the track, and each pair of rollers keeps to the normal rails, the tipping being effected by a lever attached to the forward end of each unit. The adjustable tripping gear is raised into position, and as the lever engages with the tripper the buckets are discharged. At the driving end the units are guided round the terminal by an attachment, and when leaving this the units of the tray hang down in a vertical direction in order not to impede the fall of the material conveyed, in the event of no delivery shoot being found desirable. The chains with their guide rollers, in these conveyors, are the same as those used in the gravity bucket conveyors.

Lead Works Explosion

At Hebburn on Jan. 7, the inquest was resumed on David Long, who was killed in an explosion and fire at the lead works of Foster, Blackett & Wilson.

Margaret Hogan, giving evidence, said she placed a quantity of gelatine into a mixer, and on the following day, when the gelatine was melted, she commenced to add to it 20 gallons of naphtha. She had placed 4 gallons of naphtha in the mixer when she felt faint and made towards the door. Before she got to the door an explosion occurred and flames burst out. She got out of the shed, but remembered nothing more until she found herself in the fitting shop. There were no lights or fire in the shed and no one was smoking near the shed. She could not say what caused the explosion.

Mary Agnes Irwin stated that she was assisting David Long to paint tins near the mixer. The explosion and the flame and smoke came from the mixer and witness's clothing caught fire. She escaped from the shed, but was severely burned. Long was standing near her when the explosion took place.

The deputy coroner returned a verdict that Long had been burned to death as the result of a fire caused by the ignition of gas through some means unknown.

A course of lectures on Physical Science has been arranged by the University of London for the coming term. The lectures will be delivered on Friday evenings by Professor John Cox at the Gresham College, Basinghall Street, E.C.

Institution of British Foundrymen

Annual Dinner of Lancashire Branch

The annual dinner of the Lancashire branch of the Institution of British Foundrymen took place on Saturday, January 8, at the Albion Hotel, Manchester, the Branch President, Mr. W. H. Meadowcroft presiding.

Owing to the pressure of municipal duties the Lord Mayor of Manchester was unable to be present, and in his absence the toast of the "City and Trade of Manchester," proposed by Mr. W. H. Sherburn, was replied to by Mr. Austin Hopkinson, M.P., who said the outlook for the coming year, and especially the spring, was extremely bad. They had before them one of the most difficult times the country had ever been through. When there was so much less to share, and practically as many people to share it, a lower standard of living was inevitable. To this cloud of trade depression and privation amounting almost to starvation, there was, he thought, a silver lining. Industry could find salvation only through the efforts of those engaged in it. The most essential thing was that the wage earners should work, and he thought it would be an inducement to them to do their best if they knew they would not thereby increase the profits of the employer enormously. At his own works he adopted a scheme which limited his profit to a figure much lower than the pre-war level, and the men received their own share weekly. Output had increased enormously, and, although in every branch of trade prices had risen considerably, the product of the works could be sold at 30 per cent. above the pre-war level. He hoped employers would consider whether they could put a similar scheme in force for a few years at least.

Professor Rhead proposed the toast of the "Institution of British Foundrymen." He pointed out that the foundry industry had received less appreciation and less assistance than any other great industry, but scientific research had filled up some pitfalls, and the term "haphazard" could no longer be applied to the methods practised. The Institution had brought together the members of the craft, had broken down the spirit of exclusiveness in their ranks, and had shown them that theory and practice were good friends and, indeed, closely wedded. If the projected extensions of the Manchester College of Technology had been carried out a foundry would have been established, but for the present that was in abeyance. He hoped, however, with the help and co-operation of the members of the Institution, to put forward a scheme which would be feasible.

Replying to the toast, Mr. Oliver Stubbs, vice-president of the Institution, mentioned that in six or eight weeks the Institution would obtain a Royal Charter and the members would then be entitled to use after their names the letters denoting the Institution. An Industrial Research Department for the grey iron industry had been set up and would carry on its work in foundry laboratories up and down the country. But it was high time that Manchester had a foundry equipped on modern lines where the best education could be obtained. Lack of facilities for education and scientific research had a great deal to do with inability to meet foreign competition. The annual conference of the Institution would be held in Manchester in July next.

Progress in Motoring

The remarkable progress that has taken place in the world of motoring during the past quarter of a century is brought vividly to mind by the appearance of a handsome souvenir booklet issued to commemorate the twenty-fifth anniversary of *The Autocar*. In the year 1895, when *The Autocar* was first published, it was illegal to drive a self-propelling vehicle on the public roads at a greater speed than four miles an hour, and, as in the case of heavy traction engines, the vehicle had to be preceded by a man on foot carrying a red flag. The emancipation of motoring came in 1896, with the passing of the Locomotives on Highways Bill, which abolished the red flag and other restrictions on road traffic. From that time onward the development of the motor car has been continuous, until it has become an inseparable part of our daily life.

Training Foremen for Chemical Industries*

By Dr. Allen Rogers

The growing tendency of modern education is to give instruction along those lines which will bring the student into as close as touch as possible with the actual working conditions and should be so conducted that the theoretical subjects studied harmonise with their practical application. For many years this method has been in vogue where engineering subjects were concerned, but has only recently been introduced into chemical courses.

It is not within the province of this article to dwell upon the modified courses of chemical instruction, as given in many of our technical schools, nor to mention the excellent research work which is being carried out along lines having a direct bearing upon industrial conditions, but rather to discuss that phase of the subject which is close to the writer's heart, and which, from the start, has been a radical departure from the usual methods of chemical instruction.

Teaching Applied Chemistry

In September, 1905, the Pratt Institute inaugurated a new course known as "Applied Chemistry," at which time the writer was appointed to take charge of the industrial chemistry. He was told to equip his laboratory and so arrange his course as to give the student a training in such lines as would have a practical bearing upon manufacturing operations, and which would fit them to become foremen, superintendents and heads of departments in our numerous chemical industries.

As no other schools were giving such a course, it became a matter of originality to work out the details. To meet the demand of a large number of young men who could not afford the time or money for a four-year course with college requirements, the course was made but two years in length, and only such subjects included as had a direct relation to manufacturing operations. To afford the necessary practical instruction for the course, five miniature factories were installed, consisting of chemical works, soap works, dye works, paint and colour works, and a tannery, to which has since been added other equipment for special purposes.

During the first year of the course the student is given instruction in general and analytical chemistry, with such mathematics, physics, mechanical drawing and shop work as will assist him properly to understand the practical instruction to follow. It is in the second year, however, that he meets with the applied subjects which bring him into closer contact with the problems of the day and fits him to enter the production end of the chemical industry.

At the opening of the second year the class is divided into groups, one half being assigned to the technical laboratory and one half to the industrial laboratory. Each group works in the respective laboratory at two week periods.

While in the industrial laboratory the group is again divided into smaller groups, comprised of about five men, one of the number being foreman. For sake of illustration, suppose we consider the groups assigned to the chemical works.

The Foreman's Importance

Here the preparation of chemicals is carried out on a fairly large scale, and the students become familiar with the handling of steam jacketed kettles, vacuum pans, vacuum pump, vacuum filter, filter press, stills, centrifugal machine and drying ovens. It is not only the idea of showing how certain chemicals are made, but the broader question of operating typical apparatus, which is of the most importance.

The foremanship system is of value, as it gives the student experience in handling men and assuming responsibility. All orders, also, are given directly to the foreman, who, in turn, must transmit them to his men, and must see that they carry out each operation with accuracy and dispatch. It is part of his duty, likewise, to see that his men are kept busy, that his factory is kept clean, that his machinery is in perfect condition, and that all products manufactured should be made at a profit. The student assigned as oiler each week also reports to the foreman for instruction. As one group of men finish the assignment in the chemical works another takes its place, and so the work continues.

That part of the class not employed in the industrial laboratory is engaged on analytical problems in the technical laboratory, where they are required to make a complete analysis of such substances as water, gas, coal, cement, soap, oils, pigments, paints, canning materials and other commercial products. It is the belief of the writer that the analysis of such materials not only familiarises the student with common analytical problems, but at the same time gives him experience in quantitative separations, which will apply to unknown substances, more readily than if he had been given abstract analytical problems to solve; and further, as these are some of the common substances encountered in the works laboratory, he is prepared from the start to undertake such analysis. It is not the object of this course, however, to turn out analytical chemists, and this training simply supplements the more important industrial instruction.

When the first group of students have remained in the technical laboratory for two weeks they are assigned to the industrial laboratory again, but this time to the soap factory. In this factory not only are the various kinds of soaps prepared with the various corresponding instructions regarding the value of the fats employed and the theory of saponification explained, but the student becomes familiar with the apparatus and machinery used in this industry. In this plant he is given more confidence in himself than in the chemical works, for the product which he makes must be of the highest quality to escape criticism of his class-mates, and, what is still more important, it must be good enough to sell.

During the year about 4,000 lb. of toilet soap is made in this model soap factory, all of which finds a ready market. The equipment of the soap factory consists of an 80 gallon lye tank, 500 lb. kettle, 100 lb. crutcher, frames, slabber, cutting machine, chipper, stone mill, plodder and press.

Next in order comes the paint and colour works, the equipment for which consists of colour tanks, filter press, pebble mill, kneading machine, change-can mixer, iron mill, two water-cooled 20 in. buhr stone mills and liquor mixer. During the year about 400 gallons of ready mixed paints are made by the students at work in this factory, all of which is sold and gives entire satisfaction.

To the model tannery the group is next assigned. Various processes of vegetable and mineral tannages are carried out, together with all operations involved, from the raw material to the finished product. The equipment of this factory consists of a leach house, soak pits, lime pits, suspender pits, layer pits, paddles, mills, fleshing machine, shaving machine, union splitter, setting out machine, staking machine, rolling jacks, glazing jack, buffing wheels and measuring machine. Special rooms are also provided for finishing, drying and tacking.

As will be noticed, the equipment for this line of work is more extensive than the others. The reason for this larger equipment is due to the fact that the National Association of Tanners co-operated for eight years with the Institute in providing special training for young men going into their industry. The work was suspended during the war, and steps are now being taken by the association to establish a school of their own, which will follow very closely along the lines originally developed at Pratt Institute.

Study of Special Problems

In addition to work in the regular model factories many special problems are studied. For example, during the last year a model plant for the cracking and distillation of petroleum oil was built and operated as part of the instruction. All of the brick work, pipe fitting and carpenter work necessary was done by the second year students. This year the petroleum refining is being enlarged and a plant for the production of industrial alcohol is under construction.

By the end of the winter term each student has worked in all the model factories and has finished his instructio in dyeing, so that for the remainder of the year his time is devoted exclusively to that industry in which he intends to specialise.

Like all new undertakings this method of instruction has been criticised, especially by those who have not taken the

* From *Chemical Age*, New York. December, 1920.

trouble to investigate the methods followed and the object to be attained. It has been said that it is nonsense to teach a young man a little about soap, a little about dyeing, a little about paint, and a little about leather. This perhaps would be nonsense if it were all that the course accomplished, but such is not the case.

Up to the time that the student begins to specialise, it is not so much what he learns about any particular industry, but it is what he learns about operating typical machinery, handling men, assuming responsibility, and gaining self-reliance that counts. In other words, he is brought into touch with manufacturing operation; he handles material on a sufficiently large scale to produce something which has commercial value. If through carelessness or failure to follow directions he spoils a lot of goods it means an actual loss in money, which, in a factory, would be very apt to cost him his job. That this method develops self confidence is evident by the pride and interest which each foreman, and his men as well, take in the product manufactured, especially when the product is of fine quality. It is also gratifying to note the disappointment when the product is not up to the standard, or the cost of production exceeds the price received for the finished article.

When the student begins to specialise, however, a different condition obtains, and he then does learn not a little, but very much about the particular industry into which he hopes to enter for his life's work. It should be plainly understood that no school can turn out experienced paint makers, or expert tanners, but that the training received so fits the young men that they readily can adapt themselves to the conditions encountered in the manufacturing plant.

Of the five hundred-odd young men who have taken the course, over ninety-seven per cent. are engaged in chemical industry. Of this number over seventy per cent. are employed in the works, while the remainder hold laboratory positions. The positions held by these men are managers, assistant managers, superintendents, assistant superintendents, foremen, helpers, and chemists.

Although many of the graduates go into analytical lines we do not make this our aim, for we feel that that field belongs to the colleges and technical schools. The one great object which always is uppermost and for which we constantly are striving is to train young men for responsible positions in the factory, where, by reason of their technical training, they will be able to work more intelligently and in sympathy with the chemist, who, under present conditions, often finds it impossible even to try out his ideas in a practical way, owing to the non-receptive attitude taken by those who have the practical work in hand.

Commercial Plant Conditions

Three out of five foremen to-day will do all in their power to make any experiment go wrong which has been suggested by the chemist; while men in even higher positions will often disparage the efforts of the chemist and take the advice of the so-called practical man. Often, sad to say, the chemist is wrong, but usually for the reason that he has been given no opportunity to become familiar with the actual working conditions.

This statement is no idle dream and can be vouched for by the writer's own experience, as well as from scores of similar cases which have been brought to his attention by other chemists who all have had some such experience. To mention a few of only many instances will serve to illustrate the difficulty and discouraging conditions which are sometimes encountered by the chemist. A chemist for one of the large varnish factories near New York City had worked out a formula for making what to him appeared to be a very high grade product. He turned the formula over to the varnish maker with the request that he make up a batch in a practical way. The varnish was made, but when tested failed absolutely to give the anticipated results. On making an investigation it was found that rosin had been intentionally substituted for the fossil gum that was designated in the formula.

In a tannery, when a pack of skins were being treated by a new process of bating, the foreman turned in straw so as to convert the stock into gelatin, and then claimed that the process had dissolved the skins. So other instances could be cited, but it is not worth while to burden the reader with details of this kind.

It may be asked, why does such a condition exist? To my mind, there are two reasons; First, the average foreman or superintendent, in being very zealous of what he knows, is afraid that someone higher up will discredit his ability, while at the same time he may fear that the chemist will get his job. Second, the chemist is often to blame as he approaches the man with an "I know everything" attitude, which, from the start, antagonises the one with whom he should be on friendly terms. It is therefore the duty of the foreman, the superintendent, the heads of departments and the chemist to work together for the common good.

We are a nation of vast resources, and if we wish to conserve them we must improve our factory conditions. Not only must we have the trained chemist, with his scientific and technical knowledge, but we must have technically trained and intelligent workmen as well. The foreman who works by rule-of-thumb is no better than a machine, but the man who uses the brains which God gave him and knows what he is doing will not only make a better product, but will be capable of grasping the details of the technical points involved.

Education and Industry

It is the opinion of the writer that the time is fast approaching when all positions of responsibility will be held by men who have received a technical education, either in the university, college, technical school, trade school, or vocational institution, and especially from those schools which aim to emphasise the practical side of the technical subjects they are endeavouring to teach. For then the foreman, the superintendent and the chemist can talk in a language familiar to them all, and the details involved will no longer be shrouded in mystery.

There are those who velieve that our high schools should take up this line of instruction. In doing this, however, we must not let our enthusiasm get the better of our good judgment, for if the idea were carried too far the high school would no longer stand for liberal education, and would certainly be a step in the wrong direction. There are some subjects, however, now taught in our high schools which readily could be supplanted by a certain amount of practical instruction and trade atmosphere. As the practical things of life usually appeal to young men and women, this course would have the tendency to keep their interest and stimulate a desire for further knowledge.

It also would cause them to realise that we are living in a busy world and that in a short time they, too, will become one of the cogs in the great wheel of industry. Local conditions would determine the nature of the instruction to be given, and we would find a larger number of young people finishing their high school education than we do to-day; with the result that we would not only have more intelligent employes but at the same time better and more intelligent citizens.,

Ethylation by Ethyl Chloride

To the Editor of THE CHEMICAL AGE.

SIR,—In further reference to Dr. Callan's reply in your issue of November 20, 1920, I herewith beg to state the facts as found in our laboratory concerning the ethylation of alpha naphthalymine.

This compound has been expeditiously ethylated at 100°C. by means of ethyl chloride, and I am sure it could easily be done on a commercial scale with the aid of the extensive laboratories over which Dr. Callan has sway.—I am, &c.,

ALBERT HENNING,
Chairman and Managing Director,
Hedley & Co. (Leytonstone), Ltd.

120, Harrow Road,
London, E. 11.

Commercial Gas Company

About 80 employees of the Commercial Gas Company attended a dinner and concert held at the "Princess Alice" Hotel, Forest Gate, on Friday evening, the 7th inst., to celebrate the resuscitation of their Recreation Club, founded by Mr. G. M. Gill before the war. Mr. Alwyne Meade made an admirable chairman, and the various artistes and speakers contributed towards a highly successful evening. A hearty vote of thanks was extended to the organisers, Mr. W. Fisher and Mr. D. R. Campbell, the Hon. Treasurer and Hon. Secretary of the club respectively.

Industrial Alcohol

By James M. Doran

THE history of the development of the alcohol industry in the United States is to the chemist an extremely interesting one. Its close relationship to the fiscal policies of the Federal Government in the past and present interest the economist, and its vital relationship to the established policy of National Prohibition brings the industry to the immediate attention of all. It is a significant fact that the rapid development of chemical industry in this country during the past few years on account of the World War (in which alcohol played a vital part) has been coincident with the passage of the most far-reaching restrictive legislation so far enacted against the beverage use of alcoholic liquors in any country where chemical industry is important to its economic life. The layman thinks of alcohol largely in its beverage sense, while the chemist and industrialist regards it from the standpoint of its chemical and physical properties. The National Prohibition Act, popularly known as the Volstead Act, for the first time gave a clear legislative distinction between the two points of view.

It is unfortunate that the commercial alcohol industry developed in this country under the incubus of the beverage spirit tax laws. The construction and operation of the plants thereunder were not by any means as efficient as would have been possible under conditions where the energies were directed along economic lines rather than along those requiring continuous watcheing lest they run afoul of many of the numerous spirit statutes. At the present time, when only a small part of the Federal Revenue is derived from spirits, Congress has clearly recognised the necessity of encouraging commercial alcohol production and has repealed many of the onerous spirit laws of the past. The law formerly fixed the period of time in which a fermenter could be filled. The minimum period was 72 hours. The actual fermenting period in a molasses house is less than 36 hours. The fermenter would be required to remain empty until the expiration of the 72-hour period. The removal of this restriction during war time at once doubled the fermenting capacity of a molasses house without entailing an additional penny of expense for more equipment.

About 1870 the modern rectifying or alcohol still was unknown in this country—at least it was in its infancy and was not a factor in the distilling business. There was a rectifying industry established which comprised merely the gathering together of various lots of crude pot-still distillates, treating them with lime or soda, leaching through charcoal to remove odours, which were then termed "fusel oils," and then redistilling the leachings in a simple pot-still. The product was the original rectified spirits. When the rectifying or column still came into use the distillate not only was high of alcoholic strength but was free from the odours which were present in the original simple pot-still distillate. As a by- product was separated out the high boiling-point alcohols, butyl, anyl, &c., which being of an oily consistency were called fusel oil. Hence, the confusion existing for years as to what was fusel oil.

During this period came the great development in synthetic organic chemistry and there were created both a demand and a market for "rectified spirits." Germany first recognised the essential relationship between an abundant and cheap supply of alcohol and organic chemical industry. The phenomenal development of her dye and coal-tar medicinal industries before the war testifies to the effectiveness of the governmental handling of alcohol production not only by removing a large part of the excise burdens, but by positively encouraging its production and subsequent manufacturing use. It might well be stated that without Germany's alcohol and allied chemical industries her military and economic defense would have crumbled two years before the armistice. France and England followed Germany's lead, but in a lesser measure.

In 1906 Congress passed the first real denatured or industrial tax free alcohol act. From a rather humble beginning the use of denatured alcohol in this country has increased remarkably. To quote statistics, approximately 2,000,000 wine gallon of denatured tax free alcohol were consumed in manufacturing the first year of the Act. During the war year of 1917, 55,000,000 gallons were used and during the past year of 1919, a peace year, approximately 35,000,000 gallons were used. To-day more denatured alcohol is used than pure alcohol.

A certain amount of pure alcohol always will be an essential, but for industrial purposes the increased use for the future will be along the lines of denatured alcohol. Lest there be some confusion as to the term denatured alcohol, it might be stated that ordinary "completely denatured alcohol" is adaptable only to certain uses and processes on account of the nature of the denaturants used, that is, wood alcohol, kerosene, benzol, pyridine, &c. Specially denatured alcohol (and there are some 35 special formulæ now authorised) cannot at present be handled except for specified purposes, but the theory along which it is being developed is the addition to the alcohol of some material which will prevent its beverage use, but enhance its value for commercial purposes. An example of this is special Formula No. 35, which is alcohol containing 5 per cent. of added tetrachlorethane. This formula is authorised for use in artificial silk manufacture. Tetrachlorethane added at the denaturing plant not only prevents the beverage use of the alcohol but places in the hands of the manufacturer two of his raw materials ready mixed. It does not take a very keen imagination to perceive at once the possibilities in denaturing alcohol for specific manufactures which not only makes the raw material tax-free but removes at once the trouble and annoyance of handling and storing pure alcohol which is the bane of manufacturers nowadays as well as the prohibition officers.

The use of alcohol as a motor fuel is already firmly established. It is not fully apparent where the supply of raw material will be found to produce the quantity of alcohol which will be necessary to replace the enormous present gasoline consumption. The cost factor is such at this time that alcohol fuels are on a practical competitive basis with gasoline. If new processes are developed for the conversion of cellulose into sugar and thence into alcohol, increased production may be looked for along these lines. Our present supplies of alcohol, however, must come from saccharine materials, principally waste molasses and grains.

The centre of gravity, so to speak, of the alcohol industry of the country has moved during the past few years from the Middle West grain belt, where it developed collaterally with the beverage spirits industry, to the seaboard where Louisiana, Cuban and Porto Rican black strap molasses can be had without added transport expense. In Hawaii, where no natural petroleum is available, a very profitable alcohol motor fuel industry has been developed, the molasses used being formerly pumped into the sea. Another probable source of alcohol for subsequent use as motor fuel in Hawaii is the wastes from the pineapple canneries. A number of small plantation alcohol plants will probably be in operation there within a short time. A part of the alcohol produced is immediately conveyed to the ether apparatus and the ether produced is subsequently added to the alcohol, thus accomplishing a denaturation of the alcohol and furnishing increasing power, at lower temperature, to the explosive mixture.

In the continental United States there are several well-known trade brands of alcohol-base motor fuel now is use. Its superiority to present-day gasoline in thermal power with less carbon deposit seems to have been demonstrated. As before stated, we are confronted by the raw material factor. There are undoubtedly many raw materials available, such as fruits unfit for market, potato culls and the like, but the transport cost now involved in moving these materials to a large efficient plant and the uncertainty of supply still make their use a questionable commercial venture.

The indispensability of the alcohol industry for adequate national defence was demonstrated thoroughly during the World War. Smokeless powder production and some of the various gases, notably mustard gas, depend absolutely on ethyl alcohol. In other words, every alcohol plant is a potential arsenal.

With a difficult Prohibition situation to handle, the Bureau of Internal Revenue has a most sympathetic attitude toward industrial alcohol. Regulation No. 61 under which the industrial alcohol features of the National Prohibition Act are administered have been drawn with the ultimate idea in mind of freeing the commercial alcohol industry of every possible restriction on the economical production and the subsequent transportation and use of alcohol. It is true that the statutes now in force and the policy of Prohibition still require a strict Government control. As experience is gained under new conditions, it will no doubt be possible to draw more liberal regulations.

An Industrial Research Association

By Dr. Arthur W. Crossley, F.R.S.

THE fourth meeting of the Session of the Manchester Section of the Society of Chemical Industry was held at the Textile Institute, Manchester, on Friday, January 7. Mr. JOHN ALLAN presided over a full attendance.

Dr. CROSSLEY said it was agreed on all hands that scientific method and research must be brought into British industries if they were to survive competition with other nations which had for years past appreciated the true value of scientific effort. The point was how the necessary assistance and encouragement could be given to an industry as a whole. There appeared to be only one possibility, namely, that adopted by the Department of Scientific and Industrial Research. The suggestion was that a co-operative research laboratory should be started for an industry, supported by subscriptions from the firms engaged in the industry and by a grant from the Government, the amount of the latter depending upon the total subscribed by the firms. The grant was to remain in force for five years, at the end of which time it was hoped that industrial research laboratories would be so firmly established that further Government assistance would be unnecessary. Such was, briefly, the plan which led to the founding of the British Cotton Industry Research Association, which was supported by more than 95 per cent. of all spinners, doublers, manufacturers, bleachers, dyers, printers and finishers engaged in the cotton industry, and had some 1,461 members, including representatives of the lace-making and hosiery trades. The results achieved by the staff of the laboratories of the Association would be the exclusive property of the members of the Association, who would have equal rights in this respect.

"Rule of Thumb"

Referring to the aims of the Association, Dr. Crossley said that not long ago he made the statement that it would be difficult to find an industry as well established and capable of producing such magnificent results as the cotton industry, although it was founded so largely on rule-of-thumb methods. This statement had been severely criticised because, he thought, it had been misunderstood. He did not mean to imply that scientific method was entirely absent from the cotton industry, or that the remedy was to put all research in industrial matters under scientists trained wholly in pure science, without co-operation with the manufacturers. Scientific effort was visible on many sides in the cotton industry, but it was more often the science of invention and development, rather than of research. Cotton machinery was nothing short of marvellous in its achievements, but they did not know the "why" of many of the processes to which the fibre was submitted, though they knew the "how" with the greatest precision, and until the "why" was also known with certainty they could not say that the cotton industry had scientific fact for its foundation.

Works Laboratories

Laboratories attached to works might be divided into three groups :—

(1) Those having analytical control over raw materials, processes and products.

(2) Those devoting attention to the improvement of processes and to the introduction of new products on the market.

(3) Those attacking the theory of the fundamental sciences affecting the industry.

In every case in which an industry had been developed by means of research it had not been done by investigating the processes of the industry, but by work done towards ascertaining the fundamental or underlying theory of the subject, the following being examples :—

(*a*) The manufacture of nitric acid from the air, which was the development of a discovery of the great English chemist, Henry Cavendish.

(*b*) The manufacture of aniline dyes, again the outcome of a discovery of the English chemist, the late Sir William Perkin.

(*c*) The hardening of fats.

(*d*) The mantles used in the incandescent lamp or the incandescent electric lamp.

(*e*) The telephone, wireless telegraphy, the internal combustion engine, &c.

In an industry of such magnitude as the cotton industry the amount of fundamental work to be done was enormous, including work in the sciences of chemistry, physics, colloid chemistry and botany, bacteriology, engineering, &c. Moreover, there were numerous firms which must develop their businesses on the results of the same fundamental information, and hence this gave an opportunity for the development of research on a co-operative scale, as suggested by the scheme initiated by the Department of Scientific and Industrial Research.

The advantages of a co-operative laboratory were many, and the organised efforts of workers in several sciences would give rise to very far-reaching results which would eventually place an industry upon the sure footing of scientific fact, and make it independent of any competition from other nations. Men in such a laboratory would be in daily contact with each other, and the corporate spirit, which was essential to success, could be cultivated to the utmost.

Essential Laboratory Provisions

Among the more important requirements of such a laboratory were the following :—

1. The laboratory should be in one building, capable of easy expansion to suit the growing needs of research. A series of detached buildings did not meet the situation, as however near the buildings were to one another a feeling of isolation must exist between the various workers, which should be avoided at all costs.

2. The laboratory should be in a somewhat detached position, for the scientific worker possessed a "temperament" just as marked as the artist or the poet, and it was necessary that he should work in an atmosphere of research. It had sometimes been stated that the desired surroundings could only be found in the solitude of a university, but so long as the worker could be quiet and undisturbed, or, in other words, if he was free to devote his capacity for thought to the problem before him, the necessary atmosphere would be obtained.

3. The laboratory must be provided with a good library. Recent enquiry had shown, for example, that there were some 900 books and pamphlets, dealing with cotton, which were not to be found in any of the public libraries of Manchester.

4. There must be an information bureau, not only where precis of current literature could be prepared for the workers, but where reports on previous work on any subject could be furnished, and any desired information concerning the industry could be acquired by members of the Association.

5. There must be the closest co-operation between the members of the Association and the workers in its research laboratory. If the industry was to gain the maximum benefit from its research laboratory then the latter must become as real a piece of the organisation of the industry as the power plant was of the individual factory. The ultimate success of the co-operative research laboratory depended very largely on this factor.

Dr. Crossley than referred to the Shirley Institute which had been established at Didsbury, Manchester, under the auspices of the British Cotton Industry Association. A property with about 14 acres of ground had been secured. The position was quiet and secluded, and the existing house had been adapted to serve as the administrative block, with accommodation for offices, council room, library, &c., as well as dining room, rest room and some living rooms for the research workers. The stables were being converted into workshops, and adjoining them the first portion of the laboratories was being erected. The buildings were on a plan which would allow of easy expansion, and were so designed that when it became necessary for one of the existing departments to move to another portion of the buildings the laboratory fittings could be easily taken down, removed, and rebuilt without alteration.

Industrial Research Associations, if they wished to succeed, could not divorce themselves from pure scientific research work; rather must they regard the need for it as the main cause of their existence and devote their energies to an always closer acquaintance with the activities of the universities and

other institutions in which pure scientific research was being carried out. However much research work in universities was extended industry could not afford to rely entirely on the universities for the fundamental work required for its development. The application of science to industry was essentially a function of the industry, and the closest co-operation was necessary between the research workers and those actively engaged in the industry. For the development of life in general there were problems to be solved which went beyond the capacity of either university or industry; they were national, not to say international, and must be carried out under the auspices of the Governments of nations.

A discussion followed in which Messrs. Allan, Ormandy, Weiss, Harrison, Armstrong, Scholefield and Green took part.

Association of Industrial Chemists

Annual Meeting of Newcastle Section

THE annual meeting of the Newcastle Section of the National Association of Industrial Chemists was held on Saturday last in the Church Institute, Newcastle-on-Tyne, when the following officials for the ensuing year were elected :—Chairman, Mr. E. Turner, B.Sc.; Vice-Chairman, Mr. W. M. Sowerby; Secretary, Mr. E. F. Lumley; Treasurer, Mr. A. R. Hord; Members of Council, Messrs. J. S. F. Gard, B.Sc., D. Rogers, A. Shaw, W. Hargest, E. Hill, R. Brown, J. B. Ridley, J. R. Burley, J. H. Billson, and B. Angove; Representatives on National Council, Messrs. Ridley, Hargest, and Lumley; Auditors, Mr. C. Lord and Mr. F. Shaw.

The annual report showed that the membership had increased by 20 per cent., and reference was made to the loss sustained by the branch through the removal from the district of Mr. J. W. Martindale, B.Sc., and Mr. D. Stenhouse.

A long discussion took place on a recent conference of the B.A.C. at Newcastle, some very pungent criticism being heard.

Arbitration Sequel

IN the King's Bench Divisional Court on Tuesday, Justices Rowlatt and Bailhache had before them the case of Smith v. Meggeson & Co., Ltd., manufacturing chemists, upon a motion by the latter to set aside an award of a legal arbitrator in favour of the respondent, Mr. Sam Smith, pharmaceutical chemist, of High Street, Tonbridge.

Mr. Croom Johnson, for Messrs. Meggeson, said they sought to have the award set aside on the ground of the refusal of the arbitrator to state a special case. The parties had entered into an agreement under which Messrs. Meggeson were to take from Mr. Smith, the maker, a certain quantity of a preparation called "Weno," a face or skin cream. The agreement was for 10 years and the idea was that Messrs. Meggeson should work up the trade in this article.

The substantial question before the arbitrator was whether under the contract there was a binding obligation upon them to take a certain quantity per week or only to take a certain quantity spread over the period of 10 years. Mr. Smith said there had been a breach of the contract and claimed damages for the first 18 months, and the arbitrator awarded him £610. He was asked to put his award in the form of a special case, but had declined to do so. The parties were still working under the contract.

Mr. Justice Bailhache said there seemed no reason why Messrs. Meggeson were not entitled to the special case they had asked for. Their lordships accordingly remitted the award to the abitrator with directions that a consultative case should be stated.

Chemical Trade Marks

IN the Scottish Outer House last week judgment was given by Lord Hunter in a note of suspension and interdict by G. Walker & Sons, Ltd., manufacturing chemists, Reid Street, Bridgeton, Glasgow, against Robert Kego, manufacturing chemist, 18, Stirling Drive, Burnside, Rutherglen, and his wife.

The plaintiffs asked that the respondents should be interdicted from advertising or selling chemical or medicinal goods under certain specified names. It appeared that Robert Kego was the plaintiff's manger until November, 1919. After that date they found that respondent had registered various trade marks in his own name, the names registered having previously been suggested by the respondent and approved by the directors of the plaintiff's company as names for preparations to be manufactured and sold by the plaintiffs. Plaintiffs brought an action with a view to having the trade marks declared as their property, and in May last Lord Blackburn found in their favour and directed that the entries should be removed from the register of trade marks. Plaintiffs further stated that in March, 1920, the respondents, under the name of the Eusaline Company, issued a circular soliciting orders for preparations having names registered as trade marks dealt with by Lord Blackburn.

The respondents stated that the recipes for which the various substances were prepared were all invented by Robert Kego, and that the recipes were known to him alone and were never communicated to the plaintiffs.

Lord Hunter said that the plaintiffs had not succeeded in stating a relevant case at common law for obtaining the remedies they asked. They did not quote any case of the respondents selling their own goods as the plaintiffs' goods. As the names mentioned admittedly applied to preparations made according to a secret process known to the respondents, and which they were entitled to use in manufacturing the preparations, his Lordship did not think that they could be prevented from putting them on the market under the names by which they were known and had gained a reputation. He recalled the interim interdict already granted, and refused the note, with costs.

Roumanian Oilfields Compensation

COMMENTING on the decision of the Court of Appeal in the Roumanian Oilfields Company's petition of right against the English Government for damages caused by the destruction of its property by the Military Commission in 1916, the *Moniteur du Petrole Roumain*, the official organ of the Roumanian Government, says: "The view taken by the Court of Appeal is that it is not the English Government, but the Roumanian Government, which has to make good the damage which the petroleum industry suffered by the destruction of the wells in 1916. For some time past this has been merely a question of principle, seeing that a mixed Anglo-French Commission, presided over by Colonel Hearn, representing the English interests, was at work for a very long time last year with a view to ascertaining the amount of the loss inflicted on the oil industry in 1916.

"We understand the Commission has arrived at definite conclusions in this connection, and has submitted them to the Allied Governments. To the best of our knowledge the principle of payment for the damage then caused has been definitely settled, the basis being the actual post-war expenditure incurred in the restoration of the various properties. All that remains now is to discuss the amount and the method of payment. These will be fixed as soon as the Roumanian Commission which is examining the question of these war damages has finished its labours."

Chemical and Dyestuff Exports

THE Chemical and Dyestuffs Traders' Association, in a circular just issued to members, states that considerable uncertainty exists as to the chemicals and dyestuffs covered by the Dyestuffs' Act, and that a complete list is in preparation. Chemicals, however, excluded from the present Bill may be included in the new Key Industries Bill, which is to be introduced early next Session, and which is intended to secure protection over a limited period for the organic chemical industry and the scientific glass-ware industry. Attention is drawn to the refusal of some British manufacturers to grant certificates for the export of alizarine and other home-made dyestuffs, and it is stated that this matter is being taken up with the Board of Trade on the ground that the manufacturers' attitude, when there are surplus supplies on the home market, results in the restriction of British export trade at a time when the recovery and expansion of such trade is of vital importance to national finance. Other matters under consideration are the policy of the Profiteering Act authorities and the restrictive effect of *ad valorem* shipping rates.

The Nitrate Situation

Causes of Depression

In their half-yearly report, Henry Bath & Son, Ltd., review the nitrate of soda situation, and say that during the last six months the position has undergone a very decided change, and Chilian nitrate of soda has not escaped the depressing influences which have affected the world's markets generally. The prospects for holders of nitrate looked very bright in July. Consumption for the twelve months then commencing had been officially estimated at 2,500,000 tons, against 1,850,000 tons for the previous twelve months, and a falling off in the rate of production was anticipated. By the beginning of July the Nitrate Producers' Association had sold approximately 1,500,000 tons for delivery during July, 1920, to April, 1921, a large proportion being at prices ranging from 15s. 6d. for July to 17s. 3d. for April shipment. Early in August, further 500,000 tons August-April delivery were offered for sale; this step set in motion a decline from which there has so far been no recovery. Some re-sales have taken place down to 12s. 6d. per quintal. The depression has been aggravated by the monetary crisis which has prevailed throughout the world, and the heavy fall in freights, with the result that the value to-day of floating cargoes for the U.K. Bordeaux-Hamburg range is nominally about 18s. 6d. per hundredweight c.i.f., compared with about 26s. per hundredweight c.i.f. paid in March last.

While production during the past six months has exceeded expectations with an average figure of 4,774,000 quintals (217,000 tons) monthly, it has, on the other hand, been found necessary to modify the estimate of July, 1920-June, 1921, consumption. The appalling depreciation of Continental, and especially Central European, currencies, and a general reduction of purchasing power, can hardly fail to affect nitrate, and if consumption for the period ending June next reaches the total consumed during the previous twelve months, it will be more than the market can expect according to the present outlook. Producers were warned in November that there is little prospect of selling anything further for shipment up to June, 1921, beyond the about 1,580,000 tons already disposed of.

By October the position was threatening to become so demoralised through the competition of outside producers as to induce the Chilian Government to call upon the German producers for a clear definition of their attitude towards the association, and meantime to appoint a special Committee of the Chamber of Deputies to report on a Bill for the establishment of a new association, of which the outstanding feature was an export duty of 5, instead of the existing 3.38, gold dollars per 100 kilos, subject to a rebate of $1.62 to associated producers. Fresh negotiations supervened, and finally the German producers joined the existing association at the end of November. The association now comprises about 97½ per cent. of the total productive capacity of the industry. Previous to joining, the German producers had sold some 210,000 tons for delivery up to July, 1923, and this quantity will be reckoned against their quota for the period in question. With this exception and the production of American producers, approximately 2½ per cent. of the total capacity, the association will now control the whole output of Chili for the next three years, and it is doubtful whether the market, which has been accustomed to some outside competition, yet fully realises the new situation, though it may be said that the large holders of nitrate are thereby encouraged to face with greater equanimity the prospect of having to carry forward surplus supplies at the end of the coming season of consumption.

With practically complete control, the association has now for the first time an opportunity to reorganise the industry on a sound basis. This control does not extend to production, but only to sales and exports, and, failing any supplementary scheme for co-ordinating the continuance and cessation of output as between the different officinas, it lies with the individual producer to make his own adjustment to the outlook. The perspective from that point of view is not encouraging, and the nearest estimate which it is possible to make to-day, assuming July, 1920/June, 1921 consumption at 1,700,000 tons (against about 1,850,000 for the previous twelve months) and July, 1921/June, 1922 at 2,200,000 tons, points to the necessity of restricting production for the next eighteen months to an average of about 2,500,000 quintals (114,000 tons) monthly.

Nitrate freights have declined, and the value of steamers for January loading for the Bordeaux-Hamburg range is to-day about 65s. per ton, compared with 100s. two months ago.

Chemical Trade Wage Award

Suspension of Increased Wages

The Industrial Court have issued their award on the claim for increased wages in which the parties were the Employers' and Trades Unions' sides of the Chemical Trade Joint Industrial Council.

The application was made in order to decide what increase (if any) of wages should be paid to day workers, shiftmen and piece workers employed in works of members of the Chemical Employers' Federation, and the matter was referred under the Industrial Courts Act, 1919, by the Minister of Labour to the Industrial Court for settlement.

The general advances over the pre-war rates of male workers given under awards of the Committee on Production and the Interim Court of Arbitration or otherwise amount in general to 39s. 6d. a week, plus 12½ per cent. on total earnings in the case of plain time workers 21 years of age and over. Piece-workers have received an advance of 15 per cent. on net piece prices, plus 33s. 6d. a week, and 7½ per cent. on total earnings. The last advance was one of 6s. a week on time rates, and 15 per cent. on present list or net piecework prices, granted in accordance with a resolution passed at a meeting of the Chemical Trade Joint Industrial Council on March 30, 1920.

The claim was based mainly on the following grounds: (1) that the wages were inadequate before the war and are inadequate now; (2) that the workpeople were entitled to a higher standard of living; and (3) that the high cost of living warranted a further advance. It was resisted mainly on three grounds: (1) that the advances already given are not only equal to, but substantially greater than the advance in the cost of living; (2) that the condition of the industry is such that a further advance would imperil the continuance of certain branches of manufacture, and tend to create under-employment and unemployment, generally, throughout the industry, reference being made to a reduction in trade owing to foreign competition, to the fall in prices and to decreased demand; (3) that the time is now overdue for wages questions to be regarded from a national standpoint rather than from that of one particular industry.

The report states that the Court have given careful consideration to the facts submitted at the hearings, and recognise that as regards the state of the industry the future is uncertain, and that in some respects the outlook is disquieting. Having regard, however, to the information furnished they do not feel that the present position is such as to justify them in refusing the claim to an advance which they consider is warranted on other grounds, as, for example, the unduly low rates which prevailed prior to the war. They decided, therefore, that the men concerned, aged 21 years and over who are employed on timework not in receipt of the 12½ per cent. bonus on earnings, shall receive an advance of 4s. a week, payable at the rate of 8d. a day or shift for each day, or shift worked. The men concerned, aged 21 years and over, who are employed on time work, and are in receipt of the 12½ per cent. bonus on earnings, shall receive an advance of 3s. 6d. a week payable at the rate of 7d. a day or shift for each day or shift worked. Boys and youths, 18 years of age and over, but under 21, shall receive an advance of 2s. 6d. a week, payable at the rate of 5d. a day or shift for each day or shift worked. Piece-workers will receive advances equivalent to those granted by this decision to timeworkers, and the women concerned, aged 18 years and over, will receive an advance of 2s. 6d. a week, payable at the rate of 5d. a day or shift for each day or shift worked.

The advances are to form part of the total earnings on which the bonuses of 12½ per cent. and 7½ per cent. are to be calculated in cases in which such bonuses are payable, and are to be taken into account in the calculation of payment for overtime and night duty, and for work on Sundays and holidays (in cases in which extra payment is made for such work).

The award becomes effective from the beginning of the first pay period following December 1, 1920, but the Chemical Employers' Federation has requested all manufacturers to refrain from granting the increase until a special meeting has been held.

Physical Properties of Colloid Films

New Directions for Research

AT the meeting of the Royal Photographic Society on January 11 a lecture was given by Mr. Julius Rheinberg on "Some New Directions for Photographic Research." One of the matters to which he called attention was the investigation into the different physical properties of colloid films according to the solvents with which they had been produced and with which they might be further treated. He believed that certain simple and fundamental facts with regard to colloids, often very helpful in dealing with photographic problems, were not infrequently overlooked.

The physical properties of the film resulting from a colloid in solution depended, amongst other things, on the rate of evaporation of the solvent or solvents used, as well as on the temperature. When two solvents which evaporated at varying rates were employed together, the resulting film had a tendency to be deposited in a more irregular manner than when the evaporation took place from a single solvent. Another point was that thick colloidal solutions with two such solvents did not flow so smoothly or easily as solutions of similar concentration in which a single solvent was used. That was one of the difficulties occurring with collodion, which, for photographic purposes, was almost invariably made by dissolving the pyroxilin in a mixture of ether and ethyl alcohol, neither of which separately would dissolve it. Further, the difference in the rate of evaporation of the ether and alcohol also varied with difference in temperature, so that the resulting film had varying degrees of density or porosity according to the ratio of the solvents.

Mr. Rheinberg said that he had adopted a different method of making collodion for photographic work. A suitable single solvent was found in the use of pure methyl alcohol, which would by itself dissolve celloidin or any of the other photographic forms of pyroxilin. The collodion film formed by such a solution was, however, slightly opalescent, showing that the structure was comparatively coarse, that it was very porous, and not as dense therefore as ordinary ether alcohol collodion. But he had found that this could be altered by adding to the made-up solution a certain quantity of ethyl alcohol, the rate of evaporation of which was comparatively close to that of the methyl alcohol. The more ethyl alcohol, up to about 50 per cent., that was added, the denser, the less porous, and the clearer became the film. It was, therefore, easy to produce a film the physical properties of which were controlled and regulated in these respects.

The coating of plates in a smooth and regular way was as smooth and easy with the methyl alcohol collodion, or the methyl alcohol (plus a moderate proportion of ethyl alcohol) collodion, as it was difficult in the case of the ether-alcohol collodion. If the film was required to be temporarily more porous, all that it was necessary to do was to put it in a bath of water and spirit, the amount of spirit determining the degree of porosity which would be obtained. The time of immersion was not of great importance, as the film soon swelled to the maximum amount. As spirit—*i.e.*, ethyl alcohol—would not dissolve the film by itself, it might be immersed in spirit alone in order to obtain a fairly considerable increase in porosity. If that did not suffice, methyl alcohol might be added to the spirit, up to 25 per cent., to produce increased swelling or porosity.

Mr. Rheinberg concluded by saying that the whole subject of the physical properties of the colloid films with which photographers had continuously to deal, and the bringing of these properties into greater service or new ways of utilisation, was a field of research which would well repay greater attention.

In the discussion which followed, Mr. F. F. Renwick said that every one who had had to do with gelatine or collodion realised the great importance of understanding its physical properties, and also the bearing which the nature of the solvent had upon the case; but the general knowledge from the scientific point of view was so scattered and incoherent that such contributions as Mr. Rheinberg's would greatly assist in arriving at some measure of co-ordination. Mr. K. C. D. Hickman urged the use of amyl acetate as solvent instead of methyl alcohol, the former having been found suitable by manufacturers of varnish. Mr. Rheinberg replied that amyl acetate was very refractory and took a great length of time to dry. He had started by dissolving the pyroxilin in every solvent he could find in the books and comparing the results, and had been led empirically to methyl alcohol, which seemed to answer best to the required relationship with the other chemicals, a consideration which, of course, had to be kept in mind.

December Trade Returns

Export and Import Decreases

IMPORTS during the month of December were lower by £1,474,938 than the November imports and were, in fact, the lowest recorded for any month this year. Imports for the year total £1,936,742,120, as against £1,626,156,212 for 1919, and £768,734,739 for 1913. Taking into consideration the difference in values it will be seen that as regards quantities the past year's imports are roughly about the same as they were in 1913. Exports having recovered in November show a decrease on the month's figures of £22,734,471, and with the exception of February (£85,964,130) are the lowest recorded for the whole 12 months. Seasonal slackness and holidays may have contributed to this decline, but, in any case, the figures are by no means comforting in view of the urgent necessity for increasing our export trade. Compared with the figures for December, 1919, the month under review shows an increase of £5,772,290. The aggregate value of exports compared with November shows a decrease of £23,150,274.

A decrease of £415,803 is shown in re-exports, the figure for which is given at £12,699,056. The adverse balance of trade is consequently increased to £33,455,666, which compares rather badly with November's balance, the lowest during the year, of £11,780,000.

Dyestuffs show a falling off as compared with the exports of the corresponding month last year, being less by 17,139 cwt., but the total for the year, 302,914 cwt. shows a substantial increase on last year's total of 184,467 cwt. The figure for 1913 was 208,879 cwt.

Coal, Chemicals and Dyes.

During December coal to the value of £9,344,689 was exported, a decrease of £104,353, as compared with December, 1919, but the figures for the past year show an increase of £16,413,432 on the previous year.

In the exports of manufactured articles an increase is apparent in chemicals, the value for the month being £3,016,964 as against £2,871,799, the corresponding figure for 1919. Compared with November, exports for the month under review are less by £944,098. Oils, fats and resins (manufactured) were exported to the extent of £612,609, or £988,680 less than the previous December. On the other hand, the imports, at £7,263,882 stand higher by £3,793,456 than they did in December, 1919. Imports of chemicals, drugs, dyes and colours also show an increase of £121,709, compared with 1919.

Looking at the detailed statistics of chemical exports and comparing each with the corresponding month in 1919, we find a notable increase in the export of sulphuric acid which is given at 39,438 cwt., against 19,540. Ammonium sulphate is lower, being 10,429 tons, compared with 14,463, while bleaching powder at 31,976 tons shows an increase of 5,906 tons. In the coal tar products benzol and toluol stand less by 72,947 gallons at 6,931. Naphtha also shows a decrease, being 14,415 gallons, against 41,597; but naphthalene is nearly doubled at 10 297 cwt. Tar oil, creosote, &c., at 2,248,965 gallons, show an increase of 1,500,754. Potassium compounds are considerably less, exports of chromate and bichromate being 894 cwt., as compared with 2,366. Sodium compounds are less by 168,080 cwt., while an increase of 48 tons is recorded for zinc oxide.

Through the shortage of orders from steel works, PORTHYWAEN LIME WORKS, near Oswestry, employing 200 men, has closed down. Employment will be given as orders come along.

On Tuesday, Mr. ERNEST A. SMITH (secretary of the British Non-Ferrous Metals Research Association) addressed a meeting of the Institute of Metals (Birmingham Section) upon "Segregation in non-ferrous alloys." Mr. Smith said segregation was very difficult to prevent, and could only be kept at a minimum by careful attention to the purity of the metals used and by exercising great care in mixing.

Labour at the Cross Roads

By Ernest J. P. Benn

LABOUR has to make up its mind. It has reached a crisis more difficult, more complicated and needing more true statesmanship than any which have yet confronted it, and it is not too much to say that the whole future of the country depends, more than any other single factor, upon the wisdom, or the lack of it, displayed by the Labour Party at this juncture.

There are really two Labour movements working together and these are so closely interwoven as to render separation difficult. The great majority of the Labour Party are straightforward trade unionists, who have joined the Labour movement in order to secure the advantages of collective bargaining and to obtain the best price for their labour. No believer in the competitive system can take any logical objection to this movement; it is economically sound, and it has done much not only to improve the position of the wage-earning classes, but to benefit industry and the community generally. The other Labour movement, represented by a noisy minority, is run by Communists, whose avowed object is the destruction of the capitalist system. They aim at the ownership and control of industry by Labour, which is, of course, only another way of saying total destruction of industry. These two movements have been able to work hand in hand because they have both made use of the strike weapon and both have thought to serve their ends by a continuous increase in the remuneration of labour. A working man, while being politically a thoroughgoing Tory, has been willing to follow the lead of a Communist so long as the result was an addition to his wages. The time has now arrived when the Communist is within an ace of success, and the working man individually ,and the Labour Party as a whole, have to decide whether they are really out to destroy industry, or whether it would be better to accept the benefits so far secured by Trade Unionism, and take such steps as are necessary to consolidate them and to secure further benefits in the future. The troubles of the past, over-production and unemployment, can all be directly traced to lack of effective demand, to the absence of purchasing power. To the Labour Party is due the whole of the credit for having eradicated the one great weakness of our industrial system; it now remains to be seen whether having triumphed in that respect, Labour will have the wisdom to reap the fruits of its victory. That wisdom has not, so far, been very apparent, for while doubling and trebling purchasing power, Labour has also trebled and quadrupled costs of production.

If the statesmen who now lead the Labour Party would concentrate on a united effort to cheapen production, they could ensure to the working man a continuation of his present wages, they could reduce the cost of living, they could so increase the demand for commodities as to absorb all the unemployed, and could then pave the way for further improvements in the rate of wages. Costs of production could be reduced in two or three very simple ways without affecting the remuneration of any worker. The worker must first be invited by his leaders to take an interest in his work, and must cease to regard himself as the victim of an iniquitous system. Next a halt must be called in the process of developing all sorts of complicated rules, regulations and restrictions which are, in themselves, responsible for loss of production.

The enemies of Labour are not anxious that this should happen; they know perfectly well that by following its present course Labour is creating unemployment and bringing about a state of affairs which they hope in the end will break the whole movement. The friends of Labour can do great service at this crisis by leading working-class opinion in the right direction. It can be pointed out to them that every action which lowers the price of any commodity, confers a benefit on the whole community; on the other hand, any action which increases the cost of a commodity even though it may add a little to nominal wages, not only damages the wage-earning man who has to pay more for his requirements, but hits everybody else. If the force of the Labour Party could be turned into the direction of cheapening production without lowering wages, everybody would be very much better off.

A Central News message received from New York states that negotiations are being conducted by the ALLIED CHEMICAL & DYE CORPORATION, with a view to obtaining control of the arger potash deposits in Europe, excluding Germany.

Importance of the Merchant

A New School of Thought

SPEAKING at the quarterly meeting of the London Iron & Steel Exchange, Ltd., on Tuesday afternoon, Lord Askwith said there was at the present time a new school of thought, which suggested that manufacturers should deal with the consumers direct and eliminate the merchants altogether. This new phase had been particularly cultivated by some of the Government Departments. Leading manufacturers knew that owing to the merchant's freedom from the worries and cares of works management, his judgment in regard to buying and selling was more reliable than their own. They knew that what he made was but a small recompense for the risks which he ran and saved them from running. The merchant represented to the manufacturer, say, from 500 to 1,000 customers, and it was he who searched the world; and, no matter where his customers were—in Central Africa or Patagonia—he supplied them with the goods they required and when they required them, on terms which it would be difficult and in some cases impossible for the manufacturer to accept. It was not sufficiently recognised that merchants were, in fact, bankers, and took risks that an ordinary bank would refuse to consider. The merchant community of this country had been famed during the centuries, and in that connection they had been fortunate in having the assistance of so many Scots. (Laughter and hear, hear.) The prosperity of this country had been largely due to the enterprise of the merchant. In reference to exports, our trade had been severely damaged by the difficulties of the war and by the lack of skill in conducting exports; and our consumers in the East, for example, would be glad to get back to the merchant and deal with him as they did before the war. Those men were aware that the merchant knew what was needed far better than any Government official could know.

The manufacturer might feel that on a rising market his prospects of selling at a high price were hampered by the stock which the merchant might have secured, and which he sold in competition; but the answer to that was that by the merchant in bad times coming to the relief of the manufacturer he was a useful factor in the stabilisation of trade; and stabilising trade within certain limits was one of the most important items in the consideration of security in any big trade in this country.

He was told that a Government Committee had been appointed to examine into the question as to the profits on distribution. He trusted that Committee might take evidence from somebody who knew something about the trade, and he believed they would come to the conclusion that the profits on distribution were very much exaggerated.

If any manufacturer desired to deal direct with the consumer he would have to establish an entirely new sales department, employing clerks, travellers, &c.; he would be compelled to take orders for small quantities, which would increase the cost of packing, freight, inspection and so forth, and, most important of all, he would have to give credit, thereby necessitating the use of increased capital, in addition to the risk of incurring bad debts.

Royal College of Science

Addressing the members of the Old Students' Association on Tuesday night, Sir Alfred Keogh, rector of the Royal College of Science, pointed out that whereas in 1907 there were 188 undergraduates and 18 post-graduates, to-day there were 554 and 140 respectively. The six professors of those days compared with the present professorial staff of 21, and the cost of upkeep of £19,000 with that of £105,000 to-day. He referred to the high standard of the entrance examinations and to the improved literary tests. One great defect was that the chemical department was too small, for, with the restricted space in that department it was impossible to develop the school of mines. He invited discussion on the question whether a three years' course was sufficient for the training of a thoroughly competent scientist, and pointed out that for the least difficult qualification in medicine a five years' course was necessary. It would not be long, he added, before this was increased to six years. Could they, therefore, make a very fine chemist in three years?

Contracts Open

Tenders are invited for the supply of the following material (latest date for receiving tenders in parenthesis) :—

HALIFAX.—(February 3)—Gauge glass, oils, &c. Tender forms or information from Electricity Office, Foundry Street, Halifax. Tenders to Percy Saunders, Town Hall, Halifax.

LAMBETH.—(January 20). Supply and delivery of tar for 12 months. Forms from Mr. H. E. Anderson, C.E., Lambeth Town Hall, Brixton Hill, S.W.2. Tenders to Bruce Penny, Lambeth Town Hall.

HAMPSTEAD.—(January 24). Pitch, tar and creosote oil. Forms from and tenders to A. P. Johnson, Town Hall, Haverstock Hill, N.W.3.

CHELMSFORD.—(January 31). Distilled tar. Forms from and tenders to P. J. Sheldon, M.I.C.E., County Surveyor, Chelmsford.

LINCOLN.—(February 3). Tar and compounds. Forms from and tenders to County Surveyor, Newland House, Lincoln.

CANTERBURY.—(January 31). Tarring preparations, dehydrated coal tar and creosote oil. Forms from and tenders to P. H. Warwick, Municipal Offices, Canterbury.

Contract Let

The Corporation of Manchester has accepted the following tenders :—Buxton Lime Firms Co., Ltd., LIME AND LIME ASHES ; Cowburn & Compar, Ltd., SPIRITS OF SALTS ; and Electro Bleach & By-Products, Ltd., Middlewick, DRY CHLORIDE OF LIME.

Distillation of Tar

AT a recent meeting of the West Bromwich Corporation, a lengthy discussion took place on a recommendation of the Gas Committee to join in a scheme for ten years for the distillation of tar on a co-operative basis with the Midland tar distillers and producers. The Committee recommended the Corporation to join in the scheme, and the Mayor, in moving its adoption, said the tar would be sold to the distiller at a basic price of 1½d. per gallon, delivered to the nearest works.

The price realised by the disposal of the products distilled from the tar would be apportioned according to an agreed scale between the distiller and the producer, in addition to the 25s. per ton paid to the producer, and further interim payments would be made on the 14th of each month with a balancing-up each half-year and a division of the balance of trading profits.

An amendment to refer the matter back to the Committee was moved by Councillor Brockhouse, who contended that the Council should handle this valuable product themselves. He was afraid they were too timid and lacking in business enterprise, which was the only means of success, and he added that the only way to meet the town's financial difficulty at the present time was to do more trading.

Dr. S. D. Gill thought it would be unwise to sign an agreement for such a lengthy period in view of the fact that the tar industry and the products of tar were only in their infancy in this country. Alderman Archibald Kenrick advised the Council, in view of the smallness of the plant proposed to be installed locally, to go under the umbrella of the combine.

By a majority of 15 to 11 the amendment was declared lost, and the recommendation of the Committee to join the scheme was adopted.

Books Received

INDIA-RUBBER GOODS MANUFACTURE. By "Factory Manager." London : MacLaren & Sons, Ltd., pp. 531. 32s. 6d. nett.

SELL'S WORLD'S PRESS, 1921. 36th Issue. (London : Sells, Ltd. Pp. 548).

LUBRICATING AND ALLIED OILS. By Elliott A. Evans. London : Chapman & Hall, Ltd. Pp. 128. 9s. 6d. net.

A TEXTBOOK OF PRACTICAL CHEMISTRY. By G. F. Hood and J. A. Carpenter. London : J. & A. Churchill. Pp. 527. 21s. net.

AN INTRODUCTION TO THE CHEMISTRY OF PLANT PRODUCTS. By Paul Haas and T. G. Hill. Vol. I., third edition. London : Longmans, Green & Co. Pp. 414. 16s. net.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

LOCALITY OF FIRM OR AGENT.	MATERIALS.	REF. No.
Melbourne ...	Glassware	3
Greece (Macedonia)	Dyes ; glass	13*a*
Riga	Copper Tubing suitable for use with glucose machinery	15
Morocco ...	Glassware	22*a*
Chile	Glassware ; explosives ; rubber goods	30
St. Louis ...	Benzoic acid and salts	—
Toronto ...	Heavy chemicals ; dyestuffs ...	—
Yokohama ...	Dyestuffs ; chemicals ; artificial manures ; paints, varnishes ; scientific apparatus	—
Toronto ...	10,000 tons of fertilisers (ammonia and phosphoric-acid compound).	—
Cape Town ...	Mining chemicals	—
Brussels ...	White lead ground in oil ; powdered antimony.	—
Auckland ...	Jute goods ; chemicals	—
Copenhagen ...	Lubricating oils ; chemicals ...	—

Tariff Changes

BRITISH GUIANA.—The restriction on the importation of dyes and dyestufis in the produce or manufacture of some part of the British Empire is temporarily suspended.

DENMARK.—The export prohibition on soda has been repealed.

KELANTAN.—The Superintendent of Marine and Customs in Kelantan is empowered to refund import duties paid on kerosene, petrol, or other oil or liquid fuel if such oil is used for driving mechanical cultivators or other machines for the cultivation of land within the State.

NEW ZEALAND.—(Samoa).—The importation of explosives is prohibited except under a licence. In certain cases optical instruments and appliances and insecticides may be imported free from Customs duty.

NORTHERN RHODESIA.—The importation of certain dyes and dyestuffs, except those emanating from the United Kindgom, British Possessions or Protectorates is prohibited.

BELGIUM.—Neither import licenses nor certificates of origin are now required for chemical manures, with the exception of the following, which remain subject to license : NITROGENOUS MANURES : Sulphate of ammonia, nitrate of soda, nitrate of lime, nitrate of ammonia, and cyanamide. PHOSPHATE MANURES : Superphosphate and dephosphorisation slag. POTASH MANURES : Chloride of potassium, sulphate of potassium, crude salts of potash (kainite, silvynite, hartshorn). Other materials still subject to licence include compound chemical manures, oil seeds (except linseed and colza seed), bone and bone powder, and natural phosphate.

ITALY.—Licences are no longer required for the export from Italy of the following : Bichromates of soda and potash, cuttlefish bone, dinitrotoluol, mastic or stucco of manganese (even if composed for the greater part of manganese ore and linseed oil), and pyrites.

LITHUANIA.—The duty on linseed exported from Lithuania has been increased from 25 to 30 marks per pood.

LUXEMBURG.—The restrictions on the export of indiarubber are now withdrawn.

NETHERLANDS.—The prohibition of the exportation of the following have now been withdrawn :—Caustic potash, potassium carbonate, charcoal, glue, soda lye, soda salts and chloride of lime.

TUNIS.—A special extra tax of 2 francs per metric ton has been placed on the export of phosphate from Tunis. If the export of phosphate during any fiscal year exceeds 2,000,000 metric tons, the special tax may be reduced for the next fiscal year to a minimum of 1½ francs.

From Week to Week

There were five FATAL ACCIDENTS in the chemical industry during November.

The production of the KERN RIVER OILFIELDS during December amounted to 15,773 tons.

Serious damage was caused by fire last week at the FLAMISSET CHEMICAL WORKS, Bordeaux.

The NEW BRUNSWICK CHEMICAL CO., New Brunswick, N.J., has been acquired by the Dye Aniline Co.

Carrying a CARGO OF SALT, the Greek steamer "Vlassios" foundered in a gale off the island of Lipsos.

A nickel coinage expert suggests that the NEW COINS do not contain more than ten per cent. of nickel.

Bulletin No. 2 of the BUREAU OF BIO-TECHNOLOGY gives suggestions for the treatment of infected malt.

A youth was remanded at Belfast for throwing ACETIC ACID in the face of a woman, who has since become blind.

It is reported that the BRITISH COTTONSEED PRODUCTIONS, LTD., have acquired a wharf at Medway Street, Chatham.

It is reported that the Peruvian Government has under consideration a Bill making OIL DEPOSITS the property of the nation.

Armstrong College, Newcastle-on-Tyne, will furnish an exhibit relating to MINING at the forthcoming Efficiency Exhibition.

The United British Oilfields of Trinidad announce a combined OIL PRODUCTION of 1,628 tons for the week ending January 5.

Owing to the closing down of the PEMBREY ACID WORKS, Carmarthenshire, a considerable number of ex-service men are unemployed.

The contract for the supply of NITRATE OF SODA for the High Commissioner for India has been let to A. Cross & Sons, Ltd., Glasgow.

Mr. JAMES C. MONEY, manufacturing chemist, was last week knocked down and fatally crushed by a steam wagon in New Oxford Street.

The London office of the Union's Co-operative Tar Manufacturing Associations of North Russia is now at 38, Finsbury Pavement, E.C.

The islanders of Lewis have offered a guarantee to LORD LEVERHULME that they will not interfere with his development work in the island.

During the last 12 months 129 GERMAN SUGAR FACTORIES have worked up 2,824,800 tons of beets. The tonnage for 1919 was 2,356,300.

THE ATLANTIC PATENT FUEL WORKS, No. 2, Swansea, restarted on Monday. This is the second patent fuel works to restart within a week.

Ireland's CALCIUM CARBIDE requirements are exclusively met by the production of two factories situated in Collooney and Askeaton respectively.

The necessity for encouraging the use of SMOKELESS FUEL was emphasised last week at a meeting of the Glasgow Corporation Committee on Air Purification.

Having worked as a labourer a man charged at Southport with theft stated that he had held a responsible position with an EXPLOSIVES COMPANY in Sussex.

During the first six months of 1920 Italy imported CHEMICALS, MEDICINES AND PERFUMERY from England to the extent of 46,952 quintals, valued at 22,164,385 lire.

Charged with having in her possession a QUANTITY OF COCAINE, Helen Russell was, at Marylebone, sentenced to three months' imprisonment in the second division.

A Norwegian company proposes to exploit an invention for the PRODUCTION OF RUST-FREE STEEL, which, it is claimed, will be no more expensive than ordinary steel.

It is expected that the American Zinc Institute will send a committee to Washington to urge the placing of an IMPORT DUTY ON ZINC of from two to four cents per pound.

On Thursday night Mr. F. W. GOODENOUGH, of the Gas Light & Coke Co., addressed the City of London Tradesmen's Club on "The Conservation of our Coal Resources."

The death took place on January 7 at Beechcroft, Burnt Ash Lane, Bromley, Kent, of Mr. SAMUEL ARCHIBALD VASEY, F.I.C., F.C.S., for 30 years consulting chemist to the *Lancet*.

It is reported that a spirit distilled from sugar cane or molasses mixed with a volatile hydro-carbon and sulphuric ether is being made in Argentina as a SUBSTITUTE FOR PETROL.

Subject to all inland needs being fully met, and at the discretion of local coal and coke supplies committees, PATENT FUEL may be exported as from January 10 without restriction as to quantity or quality.

According to statistics prepared by the Ministry of Labour, 233 men and 219 women, who have been engaged in the production of AMMUNITIONS AND CHEMICALS, were registered as unemployed in the London County Council area on December 31 last.

French scientists DECLINE TO RESUME SCIENTIFIC RELATIONS with the Germans until they have disavowed the notorious manifesto signed by 93 German professors and scientists in 1914, and also the crimes committed by the German armies during the war.

A modification of the short-time system has been devised at BIBBY'S OIL CAKE MILLS, Liverpool. Each employee will take three days' holiday every fifteen weeks. Sixpence in the pound will be deducted from the wages weekly, and handed over during the holiday. The number of workers involved at present is 1,747, but the whole staff of 3,500 may be included.

The Home Secretary certifies the following processes incidental to the MANUFACTURE OF INDIARUBBER and of indiarubber goods to be dangerous: Vulcanising by means of the process known as the cold cure process; any other process involving the use of carbon bi-sulphide, sulphur chloride, carbon-chlorine compounds or benzol; and any process involving the use of lead or lead compounds.

The National Aniline & Chemical Co. announce the production of two NEW DYES, national Erie violet 2 B and national Erie fast grey M, both important additions to its series of direct dyeing colours. National Erie violet 2 B produces violet shades possessing a very fine bluish tone of good fastness to light. National Erie fast grey M yields good greys on cotton and wool and cotton and silk unions.

The death occurred suddenly, on Sunday, in an Edinburgh nursing home, of MR. DAVID RAINY BROWN, F.R.S.E., of the firm of J. F. Macfarlan & Co., manufacturing chemists, Abbey Hill, Edinburgh. Mr. Rainy Brown, who was the only son of Mr. David Brown, formerly also a partner in the firm, completed his training as a chemist in Germany, and joined his father in the firm, in which he has been the sole partner for about a year.

In accordance with powers conferred upon him by the DANGEROUS DRUGS ACT, 1920, the Home Secretary proposes to issue regulations under Sect. 3 of that Act for controlling and restricting the possession, sale and distribution of raw opium, and under Sect. 7 of that Act for controlling the manufacture, sale, possession, and distribution of morphine, cocaine, ecgonine and diamorphine, and their salts, and medicinal opium and preparations containing them.

A special course of LECTURES IN CHEMICAL ENGINEERING has been arranged at the Bradford Technical College to meet the needs of advanced students and post-graduate students already engaged in the industry. There are eleven lectures, on Wednesday evenings, the first one being delivered on Wednesday last. Amongst the lecturers are Professor Bone and Professor Hinchley, of the Imperial College of Science, London; Messrs. W. McD. MacKay, Walter Leach and J. A. Reavell (Kestner Evaporator & Engineering Co., Ltd.)

MR. WILLIAM JACKSON, a well-known Rossendale scientist and analyst, died on Monday, aged 51, at his residence, Glen Villa, Waterfoot. Mr. Jackson was partner in the Thermoscope Manufacturing Co., Hanley, manufacturing an invention of his own. He was a native of Bacup, and won important local and county council scholarships in science. He gained the associateship of the Royal College of Science, London, took his degree at Zurich, and was recently superintendent of an explosives factory at Hadfield, and teacher of chemistry at Rossendale and other technical institutes. He leaves a widow and five children.

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WATER. Stream pollution and industrial water purification. J. T. Travers. *Chem. Age* (N. York), December, 1920, p. 450.

Patent Literature

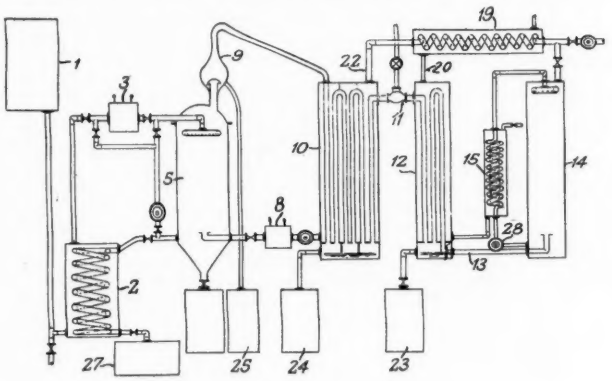
Abstracts of Complete Specifications

155,012. PEAT, BROWN COAL OR THE LIKE, METHOD OF TREATING—AND APPARATUS THEREFOR. T. A. Goskar, The Pines, Mayals, Swansea, and G. E. Thomas, 5, Bernard Street, Swansea. Application date, September 8, 1919.

Peat, brown coal, lignite or the like may be freed from a considerable proportion of its water content by ordinary compression, but the remainder is contained in the cells of the material, and is difficult to remove. It is found that if a proportion of gritty material such as powdered coal or other combustible material is added to the peat and the mixture compressed, the cells are thereby broken and the water released. The pressing is preferably carried out in porous moulds which may be lined with perforated metal and/or wire gauze. The compressed briquettes may be subjected to distillation or heat treatment to recover the oils, &c., and the residue is suitable for use as smokeless fuel. Alternatively the residue may be ground and used as the gritty material in the process described above.

155,020. OILS AND FATS, METHOD OF REFINING—WHEREBY THEY ARE DEODORISED—AND THEIR ACIDITY REDUCED. K. H. Vakil, Navsari Buildings, Hornby Road, Bombay, India. Application date, September 9, 1919.

Vegetable, fish or animal oils or fats are deodorised and their acid content reduced by heating and treating with a current of carbon dioxide or a mixture of carbon dioxide and nitrogen. Cocoanut oil is heated to 250°C., and carbon dioxide passed through for two hours, when the acidity is reduced from 5.4 to 0·58 per cent. Whale oil is heated to 275°C. to 290°C., and the acidity is reduced from 29·5 to 11·8 per cent. Sesame oil is heated to 275°C. to 290°C., and the acidity is reduced from 11·5 to 0·9 per cent. Palm kernel oil is heated to 275°C., and the acidity is reduced from 6·16 to 1·55 per cent. Ground nut oil is heated to 270°C., and the acidity is reduced from 31.4 to 0·32 per cent. In all these cases the carbon dioxide is passed through for two hours, and the oil is also deodorised.



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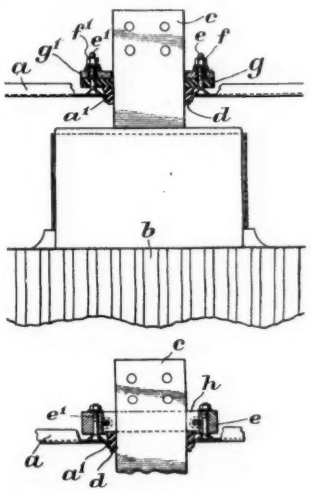
The crude oil passes from a tank, 1, to a heat exchanger, 2, and electric heater, 3, and then to a refining tower, 5. Carbon dioxide with or without nitrogen is passed through the heater, 8, to the bottom of the tower, 5, through which it passes in counter-current to the oil. The volatile acids pass through the separator, 9, where liquid is separated, and is drained to the receiver, 25. The hot gases are cooled and partly condensed in the condenser, 10, which is cooled by cold gas from the pipe, 22, and the condensate passes to the vessel, 24. The gas is then subjected to a steam jet, 11, and the mixture passes to a condenser, 12, the condensate from which is collected in the vessel, 23. The gas then passes through a pipe, 13, to a scrubber, 14, where it is purified by a current of mineral or vegetable oil which is circulated by a pump, 28, in a closed circuit which includes the water-cooled coil, 15. The purified gas is then passed through the heat exchangers, 19 and 10, the former of which is heated by hot water from the condenser, 12. The gas then passes to the heater, 8, for further use. The refined oil passes from the tower, 5, to the heat exchanger, 2, and receiver, 27.

155,118. ELECTROLYTIC CELLS. I. H. Levin. 2635, Penn Avenue, Pittsburgh, Pa., U.S.A. Application date, December 31, 1919.

The object is to provide an electrolytic cell with a gas-tight insulating support for the electrodes. The sheet metal casing, *a*, of the cell is provided with a rectangular opening, a^1, in the top, having its edges converging slightly towards the interior of the cell. The electrode, *b*, has a terminal, *c*, projecting through the opening. The terminal is maintained in position by a member, *d*, of indiarubber, or other insulating material which is compressed between the terminal and the cell wall by means of a plate, *g*, of insulating material, such as hard vulcanized indiarubber. Studs, *e*, e^1, are welded to the casing to ensure a gas-tight joint, and the insulating ring, *g*, is secured by a metal ring, g^1, which is out of contact with the terminal, *c*, and is held in position by nuts, *f*, f^1. In a modification, the insulating ring, *g*, is replaced by a wooden block, *h*, impregnated with paraffin or other moisture-resisting material. The cell may be assembled with the terminal, *c*, projecting through the top, and a gas-tight joint may then be made by compressing the ring, *d*, between the terminal and the cell wall. The casing parts may then be permanently united, and any repacking of the terminals may be effected from outside.



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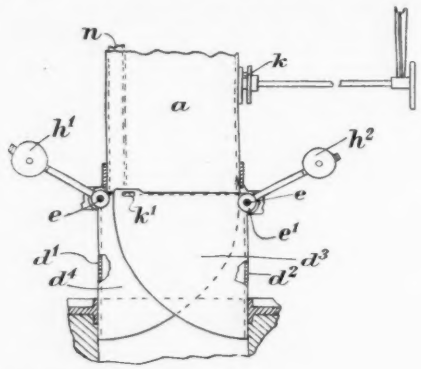
155,164. TUNNEL KILNS OR FURNACES. R. C. Metcalfe, 239, North Fifth Street, Newark, N.J., U.S.A. Application date, April 7, 1920.

A horizontal tunnel kiln is provided with an extension at each end and with a single reciprocating carrier of a length equal to the length of the kiln plus one of the end extensions. Lateral openings are provided in the kiln at both ends for the introduction and removal of material. These openings are in such a position that the material introduced through them is transported to the high temperature zone at the middle of the kiln when the carrier moves to the other end of its travel. Combustion chambers are arranged at each side of the high temperature zone so that the combustion products flow in opposite directions. The carrier is provided with barriers or doors which are adapted to close the ends of the high temperature zone of the kiln in either position of the carrier, and thus obstruct the flow of hot gas from the high temperature zone into either end of the kiln.

155,167. GAS MAKING RETORTS, PRODUCERS OR THE LIKE, MEANS RELATING TO THE CHARGING OF INCLINED OR

VERTICAL. R. & J. Dempster, Ltd., and G. F. H. Beard, Gas Plant Works, Oldham Road, Manchester. Application date, April 15, 1920.

The object is to provide a device between the feeding hopper and the mouth of the retort whereby communication between the retort and hopper is automatically established during charging operations and automatically discontinued after the operation. The lower end *a* of the hopper is provided with two closure plates, d^1, d^2, which normally extend horizontally across the mouth of the hopper. Side extensions, d^3, d^4, project at right angles from the plates d^1, d^2, and are normally



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adjacent to the side walls of the hopper. The two closure plates are pivoted at *e* and are counterbalanced by weights h^1, h^2 on levers *h*. When the hopper is being loaded the closure plates are maintained in closed position by a locking member, *k*, engaging with a slot, k^1, but when the lock is disengaged the weight of the fuel opens the plates d^1, d^2, so that they extend across the space between the hopper and the retort forming a closed conduit. When relieved of the weight of the fuel the plates d^1, d^2, are returned to the closed position by the weights h^1, h^2. Imprisoned air, smoke or dust is enabled to escape through a passage, *n*.

NOTE.—The following specifications, which are now accepted, where abstracted in THE CHEMICAL AGE when they became open to inspection under the International Convention: 132,510 (R. Gans), relating to production of iron-free ammonium alum from aluminium sulphate solutions containing ferric sulphate, *see* Vol. I., p. 604; 135,187 (Aktiebolaget Ferrolegeringar), relating to production of chromium or alloys of chromium, see Vol. II., p. 130; 138,915 (Hunter Dry Kiln Co.), relating to treatment of rubber, *see* Vol. II., p. 510; 147,543 (W. Traube), relating to a process for extracting ethylene from gaseous mixtures containing it, *see* Vol. III., p. 429.

International Specifications Not Yet Accepted

152,667. ROASTING FURNACES. Rheinisch Nassauische Bergwerks and Hutten Akt.-Ges., Stolberg, Germany. International Convention date, October 20, 1919.

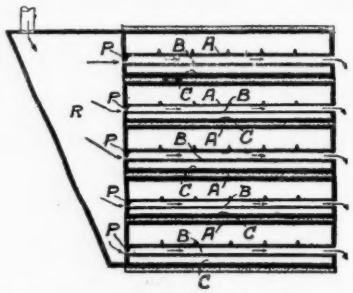
A roasting furnace having superposed hearths alternately fixed and rotating is provided with independent driving gears for the hearths, which are capable of reversal.

152,668. FURNACES. H. Strache, 15, Theobaldgasse, Vienna. International Convention date, August 6, 1919.

Fuel is fed from a hopper through a series of parallel pipes on to a travelling grate or a stepped grate. The furnace gases are passed oper the pipes so as to coke the fuel, and the volatile products are drawn off by a fan and treated for the recovery of by-products. The apparatus is described.

152,671. CATALYTIC REACTIONS, CONTROLLING. C. Conover, 532, Willard Street, Grafton, Pa., U.S.A. International Convention date, April 30, 1919.

The apparatus is built up of a number of units, each consisting of a flat tubular reaction chamber, *B*, with a cooling chamber, *A*, above and a similar cooling chamber, *C*, below. The units are separated by heat insulating material. The gases which are to be brought into reaction pass from the chamber, *R*, to the tubes, *B*, under pressure through small openings, *P*, and the upper and lower sides of the reaction chamber may be maintained at different temperatures by the two jackets *A*, *C*.



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The heat absorbed in the jackets from the reaction is transferred to the inside wall of the chamber, *R*, to pre-heat the incoming gas.

152,678. CRUCIBLE FURNACES. Compagnie Generale d'Electricite, 54, Rue la Boetie, Paris. International Convention date, October 20, 1919.

The hot gases from a crucible furnace are passed through a second furnace, where another crucible is pre-heated before being placed in the main furnace. Dust is deposited in the second furnace chamber, and the gases then pass to a regenerator or recuperator.

LATEST NOTIFICATIONS

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156,079. Process for the depilation, neutralisation and bating of hides and skins. Rohm, O. December 31, 1919.

156,080. Manufacture of dichlorethylene. Wacker Akt. Ges. fur Elektrochemische Industrie. December 23, 1919.

155,814-15. Processes for the production of pure nitrogen. Thorssell, C. T., and Lunden, H. L. R. December 19, 1919.

155,824. Manufacture of anhydrous zinc sulphide. Fabriques de Produits Chimiques de Thann et De Mulhouse. December 16 1919.

156,096. Manufacture of elastic material from nitro-cellulose. Classen, C. September 3, 1919.

155,830-31. High-tension transformers. Veifa-Werke Vereinigte Electrotechnische Institute Frankfurt-Aschaffenburg and Dessauer, F. September 29, 1915.

155,836. Process and apparatus for the manufacture of dispersoids. Planson, H., and Vielle, J. A. February 8, 1919.

156,103. Process for the manufacture of silver-thioglycolate of sodium. Chemische Fabrik Flora. November 12, 1919.

156,111. Rotary pumps. Kinney, J. R. March 4, 1914.

156,110. Process for the manufacture of diolefines and/or polymerisation products thereof. Planson, H., and Vielle, J. A. April 23, 1918.

115,117. Manufacture of vinyl compounds and polymerisation products thereof. Planson, H., and Vielle, J. A. May 24, 1918.

156,118. Process for the manufacture of rubber-like substances. Planson, H., and Vielle, J. A. October 31, 1918.

156,119. Process for the manufacture of rubber-like substances. Planson, H., and Vielle, J. A. December 2, 1918.

156,120. Process for the manufacture of vinyl halides. Planson, H., and Vielle, J. A. September 9, 1918.

156,121. Process for the manufacture of alkyl ethers of vinyl alcohols and homologues thereof. Planson, H., and Vielle, J. A. May 24, 1918.

156,122. Process for the manufacture of diolefines and derivations thereof. Planson, H., and Vielle, J. A. December 8, 1919.

156,123. Process and apparatus for extraction of carbonaceous substances or hydrocarbons. Planson, H., and Vielle, J. A. November 5, 1919.

156,135. Synthetic production of ammonia. Soc. L'Air Liquide, Soc. Anon Pour L'Etude et L'Exploitation des Procedes G. Claude. December 30, 1919.

156,136. Process for the manufacture of hexamethylene tetramine. Planson, H., and Vielle, J. A. September 9, 1919.

156,139. Process for the manufacture of low-boiling chlorinated hydrocarbons. Planson, H., and Vielle, J. A. December 8, 1919.

156,140. Manufacture of lubricating oils. Planson, H., and Vielle, J. A. December 12, 1919.
156,141. Process and apparatus for obtaining and oxidising paraffins or the like and obtaining soaps therefrom. Planson, H., and Vielle, J. A. June 4, 1919.
156,142. Manufacture of dispersoids, colloid powder and masses therefrom. Planson, H., and Vielle, J. A. August 29, 1918.
156,143-44. Process for the manufacture of rubber and ebonite substitutes. Planson, H., and Vielle, J. A. February 25, 1918; December 13, 1919.
156,145. Process for the manufacture of diols and diolefines. Planson, H., and Vielle, J. A. September 18, 1916.
156,146-47. Process for the oxidation of acetaldehyde to acetic acid. Planson, H., and Vielle, J. A. July 5, 1918; September 6, 1918.
156,148. Process for the manufacture of formaldehyde and methyl alcohol. Planson, H., and Vielle, J. A. September 9, 1919.
156,149. Process for the manufacture of paintable compositions. Planson, H., and Vielle, J. A. April 23, 1918.
156,151. Process for the manufacture of resinous condensation products. Planson, H., and Vielle, J. A. May 24, 1918.
156,152. Process and apparatus for the manufacture of acetaldehyde or acetic acid. Planson, H., and Vielle, J. A. January 28, 1919.
156,162. Apparatus for the diffusion of essence or volatile liquids. Moulin, R. June 14, 1919.
156,168. Gas-producers. Georgs-Marien-Bergwerks-und Hut-Ten-Verein-Akt.-Ges. May 14, 1915.
156,170. Manufacture of ammonium sulphate. Koppers Co. May 10, 1918.

Specifications Accepted, with Date of Application

138,061. Phenols and Aldehydes, Process for the production of condensation products of. D. A. Jaloustre, Z. Kheifetz and M. Warchabsky. September 23, 1919.
141,059. Condensation products of acrolein with phenols. C. Moureau and C. Dufraisse. March 31, 1919.
147,535. Bleaching and disinfecting agents, Process for the production of. G. Kereszty and E. Wolf. July 12, 1919.
148,743. Butyl paramino benzoate, Manufacture of normal. Soc. Chimique des Usines du Rhone Anciennement Gilliard, P. Monnet et Cartier. July 30, 1919.
155,600. Tungsten powder, Method for the production of metallic, direct from sodium and potassium tungstates. C. J. Head. October 13, 1917.
155,609. Purification and separation of filtration of liquids or liquors, Process for. J. N. A. Sauer. June 20, 1919.
155,610. Water, Process for the sterilisation and purification of. J. N. A. Sauer. June 20, 1919.
155,611. Filtering, decolorising and purifying processes for liquids, and liquors, juices, liquefied bodies and the like. J. N. A. Sauer. June 20, 1919.
155,679. Gas producers. J. M. Wallwin. October 14, 1919.
155,692. Sulphur, Purification of. J. J. Hood. October 25, 1919.
155,726. Dyestuffs, Process of producing. E. Hart and I. J. Stewart. January 21, 1920.
155,732. Destructive distillation of oil-bearing material *in situ*, Heating means for use in. D. Diver. March 20, 1920.
155,748. Dialkyl-amino-ethyl derivatives of theo-bromine, Process for the preparation of. Soc. Chimique des Usines du Rhone Anciennement Gilliard, P. Monnet et Cartier. March 1, 1920.
155,750. Coke or other material resulting from distillation in vertical retorts, Retaining device for. J. Pieters. July 27, 1920.
155,751. Vertical continuous distillation retorts, Apparatus for discharging material at the base of. J. Pieters. July 27, 1920.

Applications for Patents

Akt.-Ges. für Anilin-Fabrikation. Production of oil colours, varnishes polishes, &c. 283. January 4. (Germany, December 18, 1915.)
Anderson, L., and Boots Pure Drug Stores, Ltd. Manufacture of derivatives of 3.3′ diamino 4.4′ dihydroxyarsenobenzene dihydrochloride, &c. 815. Jan. 7.
Aschkenasi, L. Manufacture of perborates and di-sodium-perphosphates. 757. January 7. (Germany, November 27, 1918.)
,, Manufacture of perborates. 758. January 7. (Germany November 27, 1918.)
Blanc, G. A. Extration of potash from lecite or leucitic rocks. 471. January 5. (Italy, January 5, 1920.)
Boehringer Sohn, C. H. Production of alphalobelin. 114. January 3. (Germany, September 21, 1916.)
Boocock, M., Wyld, W., and Holmes & Co., Ltd. Recovery of ammonia from ammoniacal-liquor. 515. January 6.
Byk Guldenwerke Chemische Fabrik Akt.-Ges. Distillation process for recovery of fatty acids from fatty-acid mixtures. 295. January 4. (Germany, June 27, 1916.)
Chemische Fabriken Worms Akt.-G. Process for tanning animal skins. 61. January 3. ermany, November 16, 1918.)
Chemische Fabriken Worms Akt.-Ges. Process for regenerating metallic mercury. 62. January 3. (Germany, January 24, 1919.)
,, Manufacture of printing and stamping colours. 154 January 3. (Germany, December 31, 1917.)
,, Manufacture of metal salts. 155. January 3. (Germany, March 13, 1918.)
,, Manufacture of anthraquinone and its derivatives. 157. January 3. (Germany, May 18, 1918.)
,, Manufacture of oxidation products of organic compounds. 286. January 4. (Germany, July 15, 1919.)
,, Manufacture of constituents of low-boiling point from tar products, resins mineral oils, &c. 289. January 4. (Germany, January 23, 1917.)
,, Manufacture of anthraquinone or its derivatives. 455. January 5. (Germany, December 1, 1919.)
,, Manufacture of products of low-boiling point from tar products, resins, mineral oil, &c. 456. January 5. (Germany, March 1, 1917.)
,, Manufacture of anthraquinone and its derivatives. 457. January 5. (Germany, December 27, 1919.)
,, Manufacture of artificial resins. 664. January 6. (Germany, March 31, 1919.)
,, Manufacture of tanning materials. 665. January 6. (Germany, September 20, 1916.)
,, Tanning hides. 666. January 6. (Germany, September 23, 1916.)
,, Manufacture of phenol condensation products. 804. January 7. (Germany, September 9, 1918.)
,, Manufacture of tanning materials and process of tanning therewith. 813. January 7. (Germany, October 25, 1916.)
,, Manufacture of foundry cores. 814. January 7. (Germany, March 31, 1919.)
Chemische Fabriken & Asphaltwerke Akt.-Ges. Manufacture of tanning materials, and process of tanning therewith. 288. January 4. (Germany, September 1, 1916.)
Cross, C. F. Manufacture of sheets, &c., of fibrous cellulose. 285. January 4.
Deutsche Gold-und Silber-Scheideanstalt vorm. Rössler. Manufacture of acetone. 518. January 6.
,, Manufacture of acetaldehyde. 519. 520. January 6.
,, Manufacture of acetic acid. 521. January 6.
Dutt, E. E. & P. C. Decolorisation and treatment of mineral oils 277. January 4.
Erdmann, E. Process for obtaining paraffin and highly-viscous lubricating oils from bituminous masses. 526. January 6. (Germany, January 22, 1918.)
,, Obtaining paraffin from lignite tar, coal tar, or shale tar. 727. January 7. (Germany, August 5, 1918.)
Erdmann, E. Treatment of bituminous tars, mineral oils, tar distillates, &c. 728. January 7. (Germany, September 2, 1919.)
,, Obtaining highly-viscous lubricating oils from peat tar. 729. January 7. (Germany, September 9, 1919.)
Everett, S. Apparatus for distillation of carbonaceous materials 234. January 4.
Fabrique de Soie Artificielle de Tubize. Spinning nitro-cellulose solution. 1094. January 8. (Germany, December 28, 1917.)
Farbenfabriken vorm. F. Bayer & Co. Manufacture of azo-dyes. 146. January 3.
Farbenfabriken vorm. F. Bayer & Co. Separating or isolating organic gases, &c. 464. January 5. (Germany, November 3, 1916.)
Farbwerke vorm. Meister, Lucius, & Brüning. Manufacture of a complex aurothiosalicylic acid. 1100. January 8. (Germany, October 13, 1915.)
Glover, A., & Martin, G. Manufacture of dyes. 575. January 6.
Harnist, C. Treatment of crude cellulose. 852. January 7. (France, July 6, 1914.)
Heinicke, H. Devices for measuring air and gas pressures. 435. Januray 5. (Germany, August 19, 1918.)
Jones, W. T. Manufacture of lithopone, zinc sulphide, and ammonia. 414. January 5.
Jourdan, F. Extraction of potash from leucite or leucitic rocks. 471. January 5. (Italy, January 5, 1920.)
Leysieffer, G. Production of plastic bodies of cellulose ethers. 818. January 7. (Germany, January 10, 1920.)
Lilienfeld, L. Manufacture of colloidally-soluble substances and suspensions or emulsions. 786. January 7. (Austria, August 1, 1919.)
Matthews, W. H. Manufacture of lithopone, zinc sulphide, and ammonia. 414. January 5.
National Aniline & Chemical Co., Inc. Disazo dye. 651. January 6. (United States, July 1, 1919.)
Norsk. Hydro-Elektrisk Kvælstofaktieselskab. Removing solid nitrogen oxides from refrigeration devices. 882. January 7. (Norway, October 14, 1918.)
,, Apparatus for effecting continuous crystallisation of solutions. 883. January 7. (Norway, September 17, 1914.)

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co. and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The weekly report contains only commodities whose values are at the time of particular interest or of a fluctuating nature. A more complete report and list are published once a month. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.*

Market Report

THURSDAY, January 13.

There is a slightly better tendency than has been apparent during the last few weeks, and in some quarters it is thought that the prices of many chemicals are now at or nearing bottom.

A better enquiry on Continental account is also reported, but as yet the volume of business is not of serious import.

General Chemicals

ACETONE is in fairly good demand, and without change in value.

ACID ACETIC is thought in many directions to have touched bottom, and as the clearance of secondhand holdings progresses a healthier tone may be expected.

ACID CARBOLIC remains a nominal market.

ACID FORMIC is now offered on favourable terms, and is in rather better demand.

ACID OXALIC.—A certain hand-to-mouth business is reported at recent values.

ACID TARTARIC remains depressed. The secondhand stocks have not yet been liquidated, and Continental offerings are on rather a heavy scale.

BLEACHING POWDER has been quieter. Price nominally without change.

COPPER SULPHATE.—There is a small enquiry, but little fresh business is reported. The market remains in buyers' favour.

FORMALDEHYDE is in fair demand. Price unchanged.

LEAD SALTS are quite uninteresting. Practically no business is passing.

MAGNESIUM SALTS are slow of sale and exhibit an easy tone.

POTASSIUM CARBONATE is still on the down grade, and the demand is quite nominal.

POTASSIUM CAUSTIC.—No lower prices are reported, but little business is passing.

POTASSIUM PRUSSIATE is in slightly better supply, but the value is still maintained.

SODIUM ACETATE has been rather a better market, and the tendency is inclined to be a little firmer.

SODIUM CAUSTIC is a secondhand market, and only a nominal business is reported.

SODIUM BICHROMATE remains depressed on secondhand offering. The undertone seems to be quite good, and an improvement is not unlikely.

SODIUM HYPOSULPHITE is unchanged.

SODIUM NITRITE is, however, slow of sale, and favours buyers.

SODIUM PRUSSIATE has been in little demand, but the price is nominally unaltered.

ZINC OXIDE is still in moderate demand. Price unchanged.

Coal Tar Intermediates

There is no change to report in this section. Intermediates on the whole maintain their prices, although only a very moderate amount of business is passing.

ANILINE OIL is only in small demand.

BETA NAPHTHOL is without change.

DIMETHYLANILINE.—A little enquiry is being received on this account, although the actual business concluded is very small.

PARANITRANILINE is slow of sale, and the price is slightly easier.

RESORCIN.—Technical is lower.

SALICYLIC ACID remains inactive, and price is in buyers' favour.

Coal Tar Products

The market for coal tar products remains quiet, and prices of some articles are showing an easier tendency.

90's BENZOL is irregular, and prices range from 2s. 9d. to 2s. 11d. in the North, with 2s. 10d. to 3s. in the South.

PURE BENZOL.—There is little business doing in this article, and prices quoted are 3s. 3d. to 3s. 4d.

CREOSOTE OIL.—Is also somewhat easier, and is worth about 1s. to 1s. 1d. in the North, and 1s. 1d. to 1s. 2d. in the South.

CRESYLIC ACID.—There is little business doing. Dark 95/97 per cent., being worth 3s. 3d. to 3s. 6d., and Pale, 97/99 per cent. 3s. 8d. to 3s. 10d.

SOLVENT NAPHTHA is also in poor demand, and price quoted is in the region of 2s. 9d.

HEAVY NAPHTHA is slightly better, and is worth 3s. 3d. on rails.

NAPHTHALENE is weak. Prices for crude qualities remain from £10 to £17 per ton, and for refined from £26 to £35 per ton.

PITCH.—No new business is reported, and the market remains extremely quiet. There is, however, a little more interest shown by Continental buyers, though very low prices are put forward as a basis for buying. It is evident, however, certain requirements for the present season have still to be covered, and much depends upon the attitude of holders of pitch at the present moment.

Sulphate of Ammonia

The market for home trade is quietly steady, but for export there is much irregularity, owing to the competition in the various producing countries. Export prices, are, however, still maintained at considerably above the home trade level.

Current Prices

Chemicals

	per	£	s	d.		£	s.	d.
Acetic anhydride	lb.	0	2	6	to	0	2	9
Acetone oil	ton	90	0	0	to	95	0	0
Acetone, pure	ton	110	0	0	to	115	0	0
Acid, Acetic, glacial, 99-100%	ton	70	0	0	to	72	0	0
Acetic, 80% pure	ton	56	0	0	to	57	10	0
Arsenic	ton	100	0	0	to	105	0	0
Boric, cryst.	ton	74	10	0	to	76	0	0
Carbolic, cryst. 39-40%	lb.	0	0	10	to	0	0	10½
Citric	lb.	0	2	6	to	0	2	9
Formic, 80%	ton	85	0	0	to	90	0	0
Gallic, pure	lb.	0	5	9	to	0	6	0
Hydrofluoric	lb.	0	0	8½	to	0	0	9
Lactic, 50 vol.	ton	37	10	0	to	40	0	0
Lactic, 60 vol.	ton	47	10	0	to	50	0	0
Nitric, 80 Tw.	ton	41	0	0	to	44	0	0
Oxalic	lb.	0	1	2	to	0	1	3
Phosphoric, 1.5	ton	65	0	0	to	67	0	0
Pyrogallic, cryst	lb.	0	11	6	to	0	11	9
Salicylic, Technical	lb.	0	1	6	to	0	1	8
Salicylic, B.P.	lb.	0	1	9	to	0	2	0
Sulphuric, 92-93%	ton	8	10	0	to	8	15	0
Tannic, commercial	lb.	0	3	6	to	0	3	9
Tartaric	lb.	0	2	2	to	0	2	4
Alum, lump	ton	19	10	0	to	20	0	0
Alum, chrome	ton	60	0	0	to	65	0	0
Alumino ferric	ton	9	0	0	to	9	10	0
Aluminium, sulphate, 14-15%	ton	13	5	0	to	14	5	0
Aluminium, sulphate, 17-18%	ton	16	0	0	to	17	0	0
Ammonia, anhydrous	lb.	0	2	2	to	0	2	4
Ammonia, .880	ton	43	0	0	to	45	0	0
Ammonia, .920	ton	30	0	0	to	32	10	0
Ammonia, carbonate	lb.	0	0	7½	to	—		
Ammonia, chloride	ton	95	0	0	to	100	0	0
Ammonia, muriate (galvanisers)	ton	60	0	0	to	65	0	0
Ammonia, nitrate	ton	55	0	0	to	60	0	0
Ammonia, phosphate	ton	110	0	0	to	115	0	0
Ammonia, sulphocyanide	lb.	0	3	0	to	0	3	3
Amyl acetate	ton	420	0	0	to	425	0	0
Arsenic, white, powdered	ton	80	0	0	to	82	0	0
Barium, carbonate, 92-94%	ton	12	10	0	to	13	0	0

	per	£	s.	d.		£	s.	d.
Barium, chlorate	lb.	0	0	11	to	0	1	0
Chloride	ton	23	0	0	to	24	0	0
Nitrate	ton	55	0	0	to	56	0	0
Barium Sulphate, blanc fixe, dry	ton	30	0	0	to	31	0	0
Sulphate, blanc fixe, pulp	ton	16	10	0	to	17	0	0
Sulphocyanide, 95%	lb.	0	1	6	to	0	1	8
Bleaching powder, 35-37%	ton	30	0	0	to	31	0	0
Borax crystals	ton	41	0	0	to	42	10	0
Calcium acetate, Brown	ton	19	0	0	to	20	0	0
,, Grey	ton	29	0	0	to	30	0	0
Calcium Carbide	ton	29	0	0	to	30	0	0
Chloride	ton	12	10	0	to	13	0	0
Carbon bisulphide	ton	65	0	0	to	67	0	0
Casein, technical	ton	90	0	0	to	92	0	0
Cerium oxalate	lb.	0	3	9	to	0	4	0
Chromium acetate	lb.	0	1	2	to	0	1	4
Cobalt acetate	lb.	0	11	6	to	0	12	6
Oxide, black	lb.	1	0	0	to	1	0	6
Copper chloride	lb.	0	1	3	to	0	1	6
Sulphate	ton	41	0	0	to	42	0	0
Cream Tartar, 98-100%	ton	200	0	0	to	210	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde 40% vol	ton	130	0	0	to	135	0	0
Formusol (Rongalite)	lb.	0	4	9	to	0	5	1
Glauber salts	ton	Nominal.						
Glycerine, crude	ton	70	0	0	to	72	10	0
Hydrogen peroxide, 12 vols.	gal.	0	2	8	to	0	2	9
Iron perchloride	ton	50	0	0	to	52	0	0
Iron sulphate (Copperas)	ton	4	0	0	to	4	5	0
Lead acetate, white	ton	62	10	0	to	65	0	0
Carbonate (White Lead)	ton	53	0	0	to	55	0	0
Nitrate	ton	62	10	0	to	65	0	0
Litharge	ton	57	0	0	to	59	0	0
Lithopone, 30%	ton	37	10	0	to	40	0	0
Magnesium chloride	ton	15	10	0	to	16	10	0
Carbonate, light	cwt.	2	15	0	to	3	0	0
Sulphate (Epsom salts commercial)	ton	12	10	0	to	13	0	0
Sulphate (Druggists')	ton	18	10	0	to	19	10	0
Manganese, Borate	ton	190	0	0	to	—		
Sulphate	ton	130	0	0	to	135	0	0
Methyl acetone	ton	95	0	0	to	100	0	0
Alcohol, 1% acetone	gall.	Nominal.						
Nickel sulphate, single salt	ton	60	0	0	to	62	0	0
Nickel ammonium sulphate, double salt	ton	62	0	0	to	64	0	0
Potassium bichromate	lb.	0	1	3	to	0	1	4
Carbonate, 90%	ton	90	0	0	to	95	0	0
Chloride	ton	50	0	0	to	52	0	0
Chlorate	lb.	0	0	8½	to	0	0	9
Meta bisulphite, 50-52%	ton	215	0	0	to	225	0	0
Nitrate, refined	ton	65	0	0	to	67	0	0
Permanganate	lb.	0	3	0	to	0	3	3
Prussiate, red	lb.	0	3	3	to	0	3	6
Prussiate, yellow	lb.	0	1	8	to	0	1	10
Sulphate, 90%	ton	31	0	0	to	33	0	0
Salammoniac, firsts	cwt.	5	10	0	to	—		
Seconds	cwt.	5	5	0	to	—		
Sodium acetate	ton	45	0	0	to	47	10	0
Arsenate, 45%	ton	60	0	0	to	62	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	9½	to	0	0	10
Bisulphite, 60-62%	ton	37	10	0	to	40	0	0
Chlorate	lb.	0	0	5¼	to	0	0	5½
Caustic, 70%	ton	29	0	0	to	29	10	0
Caustic, 76%	ton	30	0	0	to	30	10	0
Hydrosulphite, powder, 85%	lb.	0	2	3	to	0	2	6
Hyposulphite, commercial	ton	27	10	0	to	30	0	0
Nitrite, 96-98%	ton	65	0	0	to	67	0	0
Phosphate, crystal	ton	35	0	0	to	37	0	0
Perborate	lb.	0	2	2	to	0	2	4
Prussiate	lb.	0	1	1	to	0	1	1½
Sulphide, crystals	ton	25	0	0	to	27	10	0
Sulphide, solid, 60-62%	ton	45	0	0	to	47	0	0
Sulphite, cryst	ton	17	10	0	to	18	10	0
Strontium carbonate	ton	85	0	0	to	90	0	0
Strontium Nitrate	ton	90	0	0	to	95	0	0
Sulphate, white	ton	8	10	0	to	10	0	0
Sulphur chloride	ton	42	0	0	to	44	10	0
Sulphur, Flowers	ton	19	0	0	to	19	10	0
Roll	ton	19	0	0	to	19	10	0
Tartar emetic	lb.	0	2	10	to	0	3	0
Tin perchloride, 33%	lb.	0	2	6	to	0	2	7
Perchloride, solid	lb.	0	3	0	to	0	3	3
Protochloride (tin crystals)	lb	0	2	0	to	0	2	1
Zinc chloride, 102 Tw.	ton	22	0	0	to	23	10	0
Chloride, solid, 96-98%	ton	60	0	0	to	65	0	0
Oxide, 99%	ton	45	0	0	to	47	10	0
Dust, 90%	ton	90	0	0	to	92	10	0
Sulphate	ton	21	10	0	to	23	10	0

Coal Tar Intermediates, &c.

	per	£	s.	d.		£	s.	d.
Alphanaphthol, crude	lb.	0	4	0	to	0	4	3
Alphanaphthol, refined	lb.	0	4	6	to	0	4	9
Alphanaphthylamine	lb.	0	3	3	to	0	3	6
Aniline oil, drums extra	lb.	0	1	8	to	0	1	9
Aniline salts	lb.	0	1	10	to	0	2	0
Anthracene, 85-90%	lb.		—		to		—	
Benzaldehyde (free of chlorine)	lb.	0	5	9	to	0	6	0
Benzidine, base	lb.	0	11	6	to	0	12	0
Benzidine, sulphate	lb.	0	10	0	to	0	10	6
Benzoic acid	lb.	0	2	6	to	0	2	9
Benzoate of soda	lb.	0	2	6	to	0	2	9
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol benzoate	lb.	0	9	6	to	0	10	0
Betanaphthol	lb.	0	3	0	to	0	3	3
Betanaphthylamine, technical	lb.	0	11	6	to	0	12	6
Croceine Acid, 100% basis	lb	0	5	0	to	0	6	3
Dichlorbenzol	lb.	0	0	9	to	0	0	10
Diethylaniline	lb.	0	6	9	to	0	7	6
Dinitrobenzol	lb.	0	1	5	to	0	1	6
Dinitrochlorbenzol	lb.	0	1	5	to	0	1	6
Dinitronaphthaline	lb.	0	1	6	to	0	1	8
Dinitrotoluol	lb.	0	1	8	to	0	1	9
Dinitrophenol	lb.	0	3	0	to	0	3	3
Dimethylaniline	lb.	0	5	9	to	0	6	0
Diphenylamine	lb.	0	5	0	to	0	5	3
H-Acid	lb.	0	14	0	to	0	14	6
Metaphenylenediamine	lb.	0	5	9	to	0	6	0
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	7	6	to	0	8	0
Monosulphonic Acid (2:7)	lb.	0	7	6	to	0	8	0
Naphthionic acid, crude	lb.	0	4	0	to	0	4	3
Naphthionate of Soda	lb.	0	4	3	to	0	4	6
Naphthylamin-di-sulphonic-acid	lb.	0	5	0	to	0	5	6
Nitronaphthaline	lb.	0	1	6	to	0	1	8
Nitrotoluol	lb.	0	1	4	to	0	1	5
Orthoamidophenol, base	lb.	0	18	0	to	1	0	0
Orthodichlorbenzol	lb.	0	1	1	to	0	1	2
Orthotoluidine	lb.	0	2	3	to	0	2	6
Orthonitrotoluol	lb.	0	1	3	to	0	1	4
Para-amidophenol, base	lb.	0	12	6	to	0	13	0
Para-amidophenol, hydrochlor	lb	0	13	0	to	0	13	6
Paradichlorbenzol	lb.	0	0	7	to	0	0	8
Paranitraniline	lb.	0	7	6	to	0	7	9
Paranitrophenol	lb.	0	2	9	to	0	3	0
Paranitrotoluol	lb.	0	5	9	to	0	6	0
Paraphenylenediamine, distilled	lb.	0	13	6	to	0	14	0
Paratoluidine	lb.	0	8	3	to	0	8	6
Phthalic anhydride	lb.	0	4	9	to	0	5	0
R. Salt, 100% basis	lb.	0	4	0	to	0	4	2
Resorcin, technical	lb.	0	7	6	to	0	8	6
Resorcin, pure	lb.	0	10	6	to	0	11	0
Salol	lb.	0	4	3	to	0	4	6
Shaeffer acid, 100% basis	lb.	0	3	6	to	0	3	9
Sulphanilic acid, crude	lb.	0	1	8	to	0	1	9
Tolidine, base	lb.	0	8	6	to	0	10	0
Tolidine, mixture	lb.	0	2	9	to	0	3	0

Cardiff By-Products Market

CARDIFF, WEDNESDAY, January 12.

Sulphate of Ammonia—	
For home consumption (per ton o.t.)	£23 10s. d.d.
For export (per ton f.o.b.)	£20 to £30
National Benzole (per gallon)	3s. 2d. to 3s. 6d.
Solvent naphtha (per gallon)	2s. 9d. to 3s. 2d.
Heavy naphtha (per gallon)	3s. 3d. to 3s. 4½d.
Crude naphthalene salts (per ton)	£10 to £20
Pitch (per ton)	100s. to 180s.
Creosote (per gallon)	1s. 2d. to 1s. 4d.
Motor benzol (per gallon)	3s. 2d. to 3s. 7d.
Crude benzol (per gallon)	1s. 9d. to 2s.
Toluol (per gallon)	4s.

Recent Wills

Mr. R. Jardine, of Kensington Palace Gardens, London, W., formerly a director of the Shell Transport Trading Co., Ltd. £827,404

Mr. T. D. Watson, of St. Mary's Road, Bayswater, London, W., connected with Johnson & Sons, Ltd., manufacturing chemists, and latterly secretary of the Formalin Hygienic Co., Ltd., a fellow of the Chemical Society £6,980

Mr. J. C. Morton, of Bristol £5,058

Company News

NOBEL INDUSTRIES, LTD.—Transfer books for preference shares will be closed from January 17 to 31 inclusive.

SEAGER, EVANS & CO.—Interim dividend of 1s. 3d. per share (free of tax).

SPANISH RIVER PULP & PAPER MILLS.—The directors announce a quarterly dividend of 1¾ per cent., less tax, on the common stock, payable to-day (Saturday).

DISTILLERS' CO.—Interim dividend on the ordinary shares of 8s. per share (free of tax), being at the rate of 8 per cent. per annum, payable February 1.

CANADIAN EXPLOSIVES.—A dividend of 1¾ per cent. on the 7 per cent. cumulative preferred shares is announced for the quarter ended December 31, 1920. Dividend payable to-day (Saturday).

ROYAL DUTCH PETROLEUM.—Interim dividend for 1920 at the rate of 15 per cent. (namely Fls. 150 per share of Fls. 1,000 and Fls. 15 per sub-share of Fls. 100), payable on January 17, against deposit of coupon No. 48. A year ago a similar distribution was made.

HYDRAULIC POWER & SMELTING.—The reduction of capital of the Hydraulic Power & Smelting Co., Ltd., from £500,000 to £100,000 was confirmed by the High Court of Justice (Chancery Division) on November 23 last, and registered by the Registrar of Joint Stock Companies on December 16 last.

ANGLO-CONTINENTAL GUANO WORKS.—It is announced that a further 75,000 7½ per cent. cumulative preference shares of £1 each have been issued and allotted at par. The shares represent the balance of the issue of 300,000 shares authorised by the shareholders, and are similar in all respects to the 225,000 shares already issued to the public.

WEST URAL PETROLEUM.—The balance sheet as at May 31 last shows the following items: Debit—Issued capital, £300,000; sundry creditors, £1,703; Share Guarantee Trust, Ltd., loan, £2,880; total, £304,583. Credit—Property account, £250,000; preliminary expenses, £2,061; development account, £38,245; office furniture, £30; sundry debtors, £13; cash, 6s.; expenditure, £14,234; total, £304,583.

ANGLO-JOHORE RUBBER ESTATES.—At an extraordinary general meeting of the Anglo-Johore Rubber Estates, Ltd., held on Monday, resolutions providing for the reconstruction of the company passed at the meeting held on December 23 last were unanimously confirmed. Mr. J. H. Gretton stated that in response to the scheme propounded by the Rubber Growers' Association, offering prizes for suggestions calculated to increase the use of rubber, there had been 2,000 entries. The ideas put forward were now being examined, and, in due course, the awards would be made.

BRITISH DYESTUFFS CORPORATION.—A Stock Exchange announcement states that dealings in the following securities have been specially allowed by the committee under Temporary Regulation 4, (3) (these securities will rank pari passu with those in which special settling days have already been appointed as soon as they are identical and the certificates are ready for distribution, and with those for which an official quotation has already been granted as soon as they are identical and are officially quoted):—British Dyestuffs Corporation, Ltd.—7,125 preference shares of £1 each, fully paid, Nos. 6,611,925 to 6,619,049.

SINGAPORE PARA RUBBER ESTATES.—The accounts for the year to June 30 last show a profit of £17,098. An interim dividend of 2½d. per share was paid in December, 1919, and £1,441 is now placed to reserve, £9,566 being carried forward, against £7,545 brought in. The directors state that under ordinary circumstances the amount carried forward would have enabled them to recommend a balance dividend, but they consider it is in the best interests of the shareholders to keep all funds in hand, thus placing the company in a position to weather the present crisis or any prolonged depression in the rubber industry. The premium of £9,558 on the last issue of shares has been placed to reserve, which, with the above transfer from profits, will amount to £25,000.

LONDON-ASIATIC RUBBER.—The London Asiatic Rubber and Produce Company has entered into a contract for the purchase as from January 1, 1921, of the property of the Elphil Rubber Company. In accordance with the provisions of the Companies Acts, the contract is subject to approval by the shareholders of the Elphil Rubber Company as it involves the winding up of that company. Part of the consideration is to be the issue to the shareholders of the Elphil Rubber Company of five fully-paid 2s. shares of the London Asiatic Rubber and Produce Company for each fully-paid £1 share of the Elphil Rubber Company. Such new shares are to be entitled to rank in all respects equally with the existing shares of the London Asiatic Company. The capital of the Elphil Rubber Company is £70,000 divided into 70,000 shares of £1 each.

ENGLISH OILFIELDS.—Mr. Charles L. Samson, chairman, presided at the annual ordinary general meeting of English Oilfields, Ltd., on December 30. He said that during the war the capital had been increased to £850,000. At September 30 there was owing in respect of calls on the new capital no less a sum than £65,000, but this had since been reduced to £30,000, and the directors had not the slightest doubt that this was a perfectly good asset. The company had received in premiums on the new shares issued to the shareholders and the 150,000 shares which were taken up by the option holders at the date of the balance-sheet no less than £137,500. Being in possession of that sum they thought it wise and prudent to apply it in writing down a number of items, amounting to a large sum, which were represented by money spent in development and experimental work, such as underwriting commissions, preliminary expenses, and development and administration expenses incurred from the inception of the company. The whole of this expenditure with the exception of £9,424 had been written off. Against this there were premiums received on the 25,000 shares which had been taken up since the date of the balance-sheet at 25s. per share, and they would receive at the end of January a further sum of 5s. per share on 25,000 shares, which were bound to be taken at 25s. per share. It was a very fortunate thing for the shareholders that they had secured people who in these days had sufficient confidence in the company to subscribe for 50,000 shares at a premium of 5s., seeing that the shares now stood at only just about par. The £12,500 from these premiums would be used to write off the £9,400 referred to, and would thus make the balance-sheet perfectly clean. The position of the company was better than it had ever been before.

BRITISH BURMAH PETROLEUM.—At the meeting on Tuesday of the British Burmah Petroleum Co., Ltd., the Hon. Lionel Holland, who presided, said the balance brought in from revenue account, £368,419, was considerably less than last year, the reason for the decline being, first and chiefly, the fall in the price of benzine, the increased cost of production, and the drop of some 24,000 barrels in crude oil production. There had been a handsome profit on exchange, and from the Rangoon Oil Company they received a dividend of £11,719, against £4,272 in 1919, so that the total gross profit was £525,353, as compared with £569,676. Last year they paid 17½ per cent., free of income tax, but the directors felt justified in recommending this year 20 per cent., free of income tax. The chairman went on to speak upon the policy of expansion on which they had embarked. Amongst other things, they had taken an interest in the British Sinai Petroleum Co., Ltd., from which good reports had been received. The prospects of future production in Burmah were not of a kind to give cause for any immediate anxiety, but did suggest the advantage of looking well ahead, and endeavouring to establish the prosperity of the company on broader foundations with a more extended area for exploitation.

He instanced the success which had attended the following of a similar policy by the Burmah Oil Co., which had built up the prosperity of the company and assured its future by procuring interests in oilfields in Persia, Trinidad and other territories. The British Burmah Co. could now claim that a road towards a wider sphere of enterprise had been opened up and foundations laid upon which the company might hope to build a further profitable undertaking. With this endeavour they had taken an interest in a field known as the Comodoro Rivadavia Oilfields in Argentina, on which there were already many producing wells and considerable activity. They were, however, chiefly concerned with the Peninsula of Sinai and part of Egypt, in connection with which the British Sinai Petroleum Co. had been formed. In that company they had a half interest. There was every ground geologically for anticipating success from the exploitation of that area. It was situated in oil-bearing rock, the formation being particularly suitable for the retention of oil, resembling in its physical features the structure of the Nurgada field, where the Anglo-Egyptian Oil Co. was operating with such remarkable success.

New Companies Registered

The following have been prepared for us by Jordan & Sons, Ltd., company registration agents, 116 and 117, Chancery Lane, London, W.C.2 :—

ELLEM IMPORT & EXPORT TRADING CO., LTD. Chemical and colour merchants and manufacturers. Nominal capital, £1,000 in 1,000 shares of £1 each. Directors: W. Leigh, H. A. Milnes. Qualifications of directors, £25.

GEORGE GREY & SONS, LTD., 25, Garden Street, Bury, Lancaster. Chemists, druggists, drysalters, &c. Nominal capital, £5,000 in 5,000 shares of £1 each. Directors: R. T. Weir, J. Warburton, J. Street.

HODGSON (WILLIAM L.), LTD., 33, Westgate End, Wakefield, Yorks. Dealers in drugs, chemicals, &c. Nominal capital, £500 in 500 shares of £1 each. Directors: W. L. Hodgson, H. Goodwin. Qualification of directors, 1 share.

LAWLEY CO., LTD. Manufacturers and dealers in blast furnace slag, basic slag, &c. Nominal capital, £3,500 in 3,500 ordinary shares of £1 each. Directors to be appointed by subscribers. Qualification of directors, 250 ordinary shares. Subscribers: J. T. Stobbs, T. Jones.

LEADLESS WHITE MANUFACTURING CO., LTD. Manufacturers of all manner of strontium and barium compounds, dyes, &c., and procure and treat zinc, &c. Nominal capital, £25,000 in 25,000 shares of £1 each. Directors to be appointed by subscribers. Remuneration of directors, £150 each; chairman, £250.

MINROL, LTD., 67, Dale Street, Liverpool. To purchase the sole and exclusive licence of an invention protected under certain letters patent for an improved lubricant and process for making the same. Nominal capital, £3,500 in 3,500 shares of £1 each. Directors: A. Angers, A. Dinsley, F. H. Henri, F. Wilkins. Qualification of directors, £50. Remuneration of directors, £25 and 5 per cent. of net profits to be divided.

PEMBERTON (ROBERT) & CO., LTD. Chemical merchants. Nominal capital, £2,000 in 2,000 ordinary shares of £1 each. Directors: R. E. Pemberton, M. Bertram. Qualification of directors, £100.

PRODUCTS CORPORATION, LTD. Chemical manufacturers and merchants, &c. Nominal capital, £50,000 in 50,000 shares of £1 each. Directors: W. S. Hopkins (man. dir.), F. H. Johnson, F. R. Remington. Qualification of directors, £100.

SOMERSET OXIDE & ACHRE CO., LTD. Colour grinders. Nominal capital, £5,000 in 5,000 ordinary shares of £1 each. Directors: W. H. Wall, E. H. Couzens, H. Jones, E. E. Lavis, C. Franks (all permanent directors). Qualification of directors, £10. Remuneration of directors, £130, to be divided.

TYNESIDE RUBBER CO., LTD. Outfitters, rubber merchants and manufacturers of rubber goods. Nominal capital, £3,000 in 3,000 shares of £1 each. Directors: J. Graham, G. Aitchison. Qualification of directors, £150.

WILSON ALEXANDER (BLYTH), LTD. Chemists, druggists, &c. Nominal capital, £2,000 in 2,000 shares of £1 each. Directors: A. Wilson, C. S. Hiles. Qualification of directors, £100. Remuneration of directors, £100 each.

It has been announced that the Co-Operative Wholesale Society proposes to erect a large factory in Liverpool for the MANUFACTURE OF MARGARINE, and that work on the foundations is already in progress. The proposed work will be in close proximity to the berths and sheds where the cargoes of nuts and kernels arrive.

Swansea's trade returns for the year 1920 show a HEAVY DECREASE IN IMPORTS OF ZINC ORE, the result of the spelter slump, the fall being from 48,768 tons in 1919 to 22,774 tons last year. There was an advance in the imports of copper, lead, tin, &c., from 3,731 tons to 17,259 tons, and 9,714 tons of pitch were imported, as compared with 675 tons the preceding year, an indication of the growing importance of the patent fuel industry.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

London Gazette

Companies Winding Up Voluntarily

ANGLO-CONTINENTAL FERTILISERS SYNDICATE, LTD. (in voluntary liquidation).—A general meeting will be held at the offices of the liquidator, 3-7, Southampton-Street, Strand, London, W.C.2, on Monday, February 14, at 12 noon. H. Everett, liquidator.

CARBIDE TRADING CO., LTD., G. M. Robinson, 3, Raymond Buildings, Gray's Inn, London, W.C., liquidator.

LEEDS PHOSPHATE WORKS, LTD.—A meeting of creditors will be held at the offices of W. B. Peat & Co., Royal Exchange, Middlesbrough, on Monday, January 24, at 12 noon. G. B. Nancarrow, liquidator.

MOSSLEY COLOUR & CHEMICAL CO., LTD. (in voluntary liquidation).—A meeting of creditors will be held at the offices of the liquidator, 88, Mosley Street, Manchester, on January 19, at 2 p.m. Creditors' claims on or before January 18 to J. A. Hulme, liquidator.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, created after July 1, 1908, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges which would, if created after July 1, 1908, require registration. The following Mortgages and Charges have been so registered. In each case the total debt, as specified, in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced since such date.*]

CROSSLAND CHEMICAL REFINING CO., LTD., London, W.C.—Registered January 3, charge securing all moneys due or to become due to Barclays Bank, Ltd.; general charge.

ISTHMUS SIZE & CHEMICAL CO., LTD., Huddersfield.—Registered December 29, mortgage securing all moneys due to or to become due to National Provincial & Union Bank of England, Ltd.; charged on land and buildings, &c., at Huddersfield.

WAITE'S BRITISH CHEMISTS, LTD., North Shields.—Registered December 31, £1,750 mortgage to Mrs. S. Griggs, 24, Dawson Terrace, Borough Road, North Shields; charged on 27, Bedford Street, North Shields.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. Where a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

GRAHAM, E., Prospect Place, West Silloth, Silloth, chemical worker. £15 15s. 3d. December 6.

LUNN, H. N., 402, Victoria Street, Great Grimsby, chemist. £13 9s. 9d. November 24.

NEWMAN, A. P., 51, Thompson Street, Barry Dock, chemist. £12 17s. 11d. November 24.

WYATT, F. D., High Street, Weybridge, chemist. £13 16s. 9d. November 30.

The Dyestuffs Advisory Committee

OFFICIAL intimation has been received from the Board of Trade by the Chemical & Dyestuffs Traders' Association that the Board have given serious consideration to the strong representations made by the association in favour of a trader representative being appointed on the Advisory Committee under the Dyestuffs Act, but that they regret it has been found impossible, in view of all the circumstances, to give effect to it.